THE JOURNAL OF THE AMERICAN OSTEOPATHIC ASSOCIATION

Vol. 49, No. 7 | 212 E. Ohio St., Chicago 11, Ill. | March, 1950

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Published monthly by the American Osteopathic Association. Office of Publication, 100 S. Kenilworth Ave., Oak Park, Ill. Address all communications to the Main Office at 212 E. Ohio St., Chicago 11, Ill. Subscriptions $10 a year. Acceptance for mailing at special rate of postage provided for in Section 1103, Act of October 3, 1917, authorized August 31, 1922. Entered at the Oak Park, Ill., post office as second class matter, April 1, 1926, under the Act of March 3, 1879.

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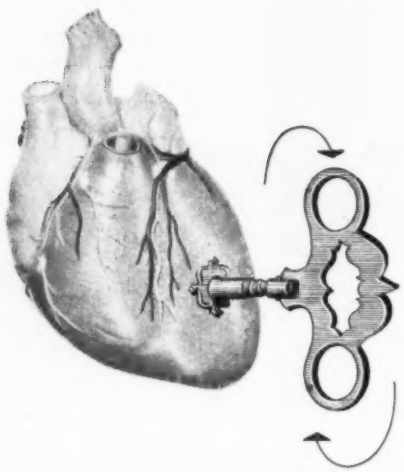

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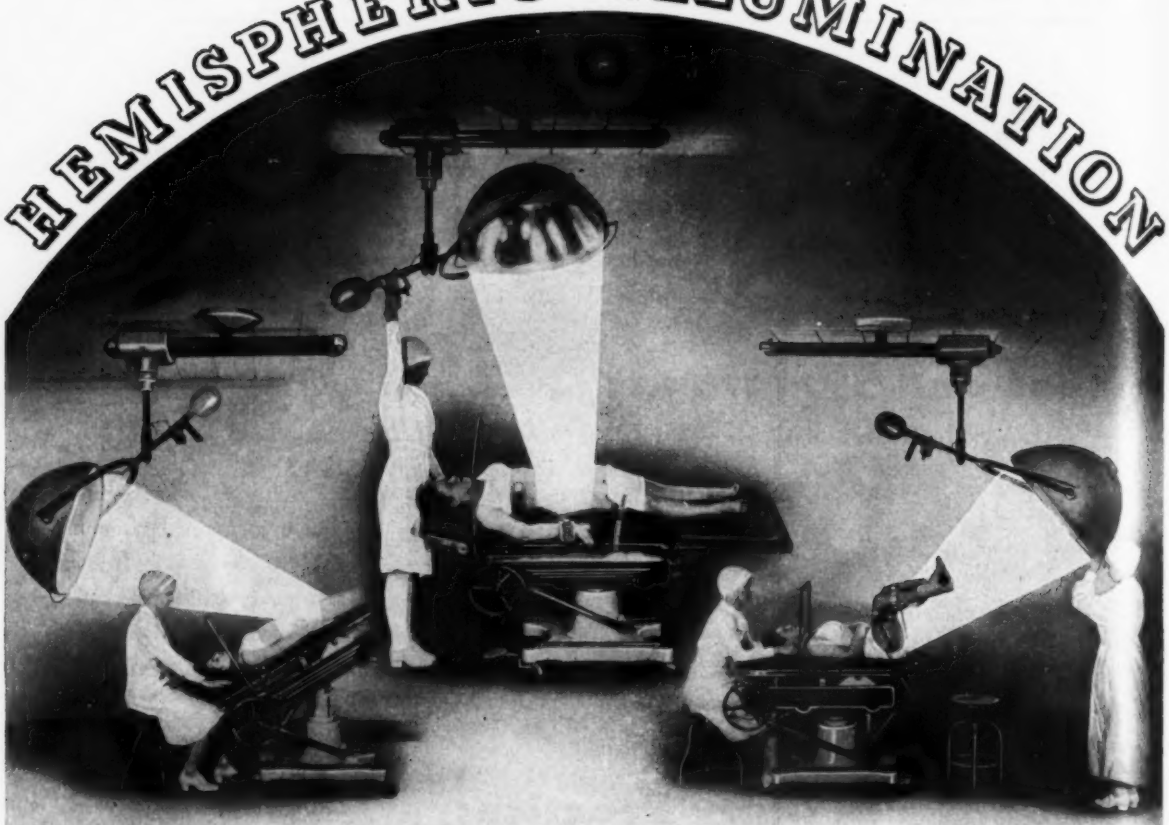

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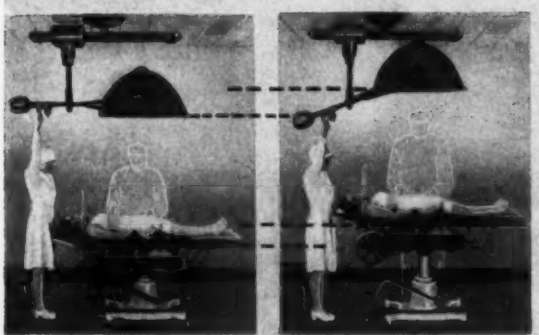

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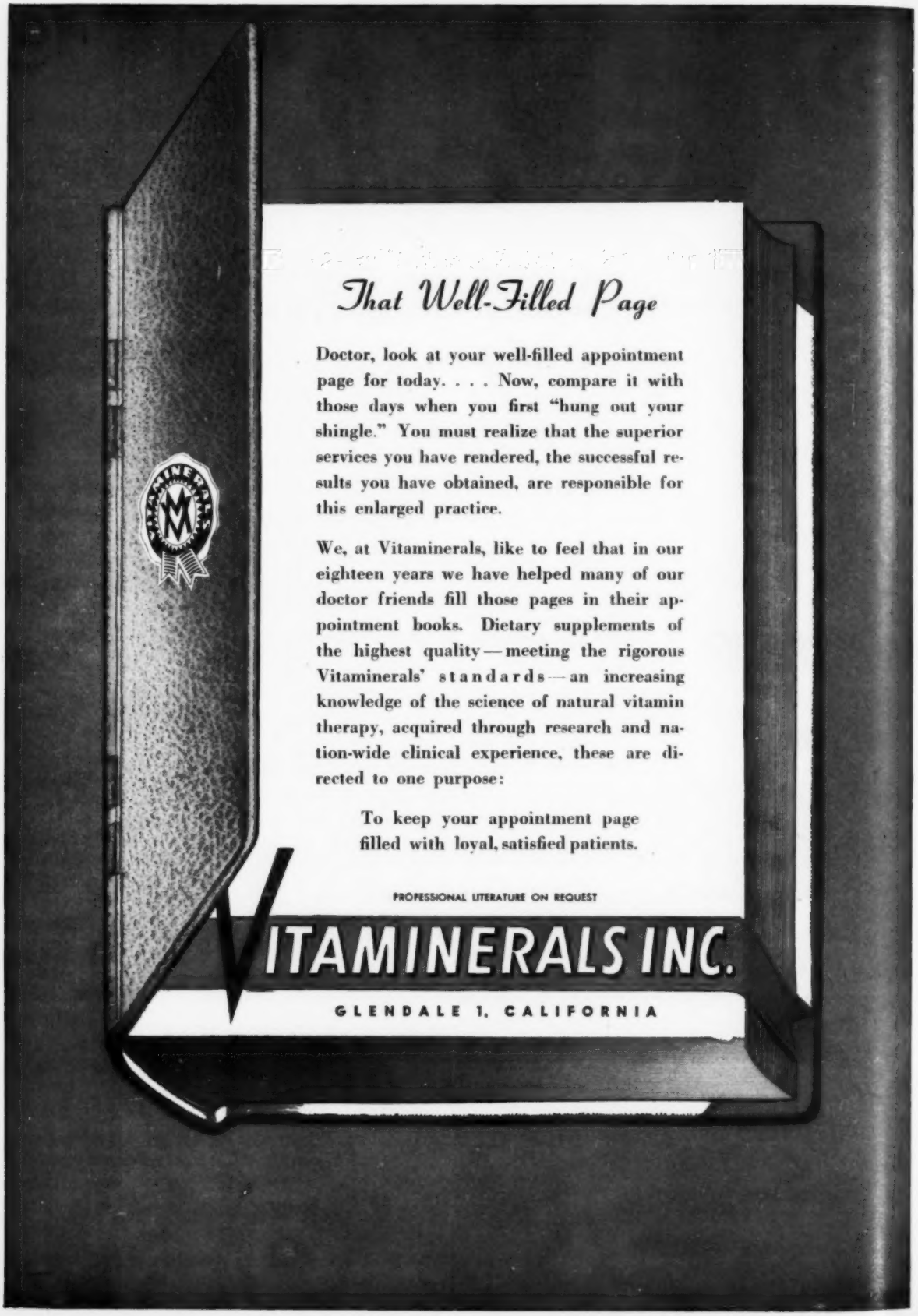
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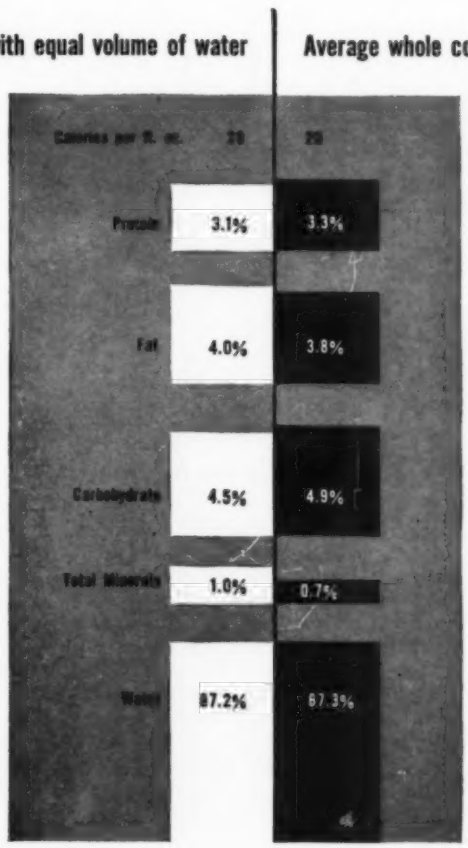

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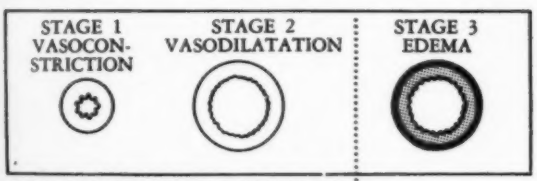

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pressure upon adjacent pain-sensitive structures. Headaches of this type may last for a few minutes only or they may last for days. Seizures are usually terminated by severe vomiting.

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1. Give complete physical examination including ancillary tests to rule out other conditions mimicing migraine.
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3. Improve the general health of the patient.
4. Give 2 Cafergone tablets at first sign of impending attack and, if necessary additional 1-tablet doses (up to 6) at half-hour intervals.

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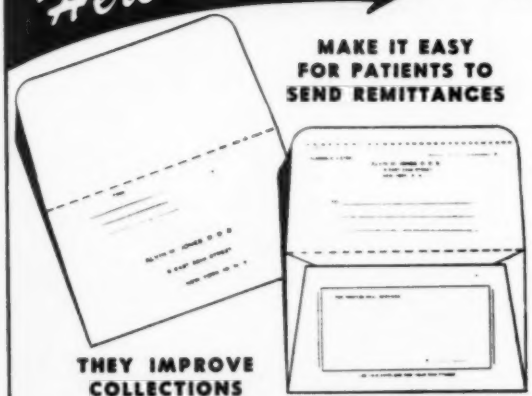

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The Journal of the American Osteopathic Association

PUBLISHED MONTHLY BY THE AMERICAN OSTEOPATHIC ASSOCIATION

Vol. 49, No. 7 | 212 East Ohio St., Chicago 11, Ill. | March, 1950

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The Osteopathic Concept of Peptic Ulcer*

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Detroit

Interference with the normal nutritive processes is a fundamental and predisposing factor in the production of disease in any organ or tissue of the body. A common cause of disturbed nutrition is anatomical malrelationships of various parts of the body or defects in their normal physiological movements. The spinal column is very frequently the location of these defects.

The above might be considered to sum up, in few words, the osteopathic concept applicable to peptic ulcer. This concept is applicable to pathologies of much of the human body. Although it is understood that consideration of peptic ulcer must not be limited to body structure—its chemical, emotional, and endocrine aspects must also be considered—this paper will be confined to the structural aspects.

I have not been able to find any direct and specific mention of peptic ulcer in the writings of Andrew Taylor Still. He classifies most gastric disturbances under the heading of dyspepsia. Under that heading he has this to say:

> What organ of the whole abdomen is without a connecting branch between itself and the solar plexus? If the nerve and blood supply and the proper functioning of each organ of the abdomen are dependent upon the solar plexus, then when we have a dyspeptic for diagnosis and treatment, we will go up to the origin of the great splanchnics in the spinal cord and come down through the diaphragm and semilunar ganglia to the solar plexus, searching for the trouble. Explore the spine in the region of the branching off of the splanchnic nerves which connect with terminals and supply the semilunar ganglia. If you find the fifth, sixth, seventh or eighth ribs of the right side are in malposition, you are on the right track and know why we have a diseased solar plexus. It is because of the failure of the semilunar ganglia to furnish to the solar plexus such supplies as it is the duty of these ganglia to furnish.[1]

Many writers of osteopathic literature have confirmed these findings and some have added to them. Notably, the work of Louisa Burns has presented much information of a proved and scientific nature.

As a beginning it is essential to review the anatomy of the structure under discussion. The stomach derives its arterial blood through the celiac artery and its branches, the gastric, the right and left gastroepiploic, and the short gastric arteries. The veins begin in the capillary plexuses around the glands and form a network in the submucosa, give off branches passing through the muscular coat, and finally form the following veins—the right and left gastroepiploic, the five short gastric veins which join the splenic vein and the coronary vein of the stomach which opens into the portal vein.

The stomach wall is composed of four layers, beginning with the outer layer, the tunica serosa. Next is the tunica muscularis composed of three muscular coats, the longitudinal, the circular, and the oblique. The third is the tunica submucosa, or submucous layer. This layer is attached loosely to the muscular layer, but rather firmly to the mucosa. It forms the bed in which vessels and nerves break up before entering the mucous membrane. The inner layer is the tunica mucosa, or mucous layer. This layer contains the glands of the stomach.

The stomach derives its parasympathetic motor fibers from the vagus nerve, stimulation of which has two main actions: (1) increased tone in or contraction of the muscles of the stomach, and (2) increased activity of the glands of the stomach. The fibers of the vagus nerve supply the entire stomach, pylorus, and cardia, and the lower two-thirds of the esophagus.

The sympathetic nonmedullated fibers going to the stomach have their motor cells in the semilunar ganglion along with those of the liver and the spleen. The medullated fibers which run from the spinal cord arise from the fifth to the ninth thoracic vertebrae. The sympathetics inhibit motility and secretion of hydrochloric acid and water and stimulate the excretion of enzymes.

The stomach shows parasympathetic motor and parasympathetic secretory reflexes due to irritation in many other organs. In cases of eye strain, there may be a hypermotility of the stomach with the afferent impulses probably carried through the sensory fibers of the fifth cranial nerve and the efferent impulses through the motor fibers of the vagus. This same condition, hypermotility, may be found in gallbladder disease, appendicitis, diverticulitis, and other conditions in which both afferent and efferent impulses are carried by fibers of the vagus.

*Presented at the Teaching Sessions on Internal Medicine, Fifty-Third Annual Convention of the Osteopathic Association, St. Louis, July 11, 1949.

Kuntz[2] sums up the autonomic innervation of the alimentary canal as follows:

Sympathetic.—Preganglionic neurons: Cells in the intermediolateral column in the spinal cord send fibers via all the thoracic and lumbar white rami into the ganglia of the sympathetic trunk and those of the celiac and associated plexuses. Ganglionic neurons: Cells in the cervical and thoracic ganglia of the sympathetic trunk send fibers to the pharynx and esophagus via separate rami and communications with the vagus nerve; cells in the ganglia of the celiac and associated plexuses send fibers to the gastro-intestinal musculature mainly via the mesenteric nerves. Function: Inhibition of the esophageal and gastro-intestinal motility.

Parasympathetic.—Preganglionic neurons: Cells in the dorsal motor nucleus of the vagus send fibers via the vagus nerve to the enteric ganglia as far distally as the transverse colon. Cells in the sacral segments of the spinal cord send fibers via the pelvic nerve to the enteric ganglia from the transverse colon distalward. Ganglionic neurons: Cells in the enteric ganglia send fibers directly to the adjacent enteric musculature. Function: Excitation of esophageal and gastro-intestinal motility.

Louisa Burns[3] found that when animals were artificially lesioned, changes in the deep spinal muscles were visible within 10 minutes with blood vessels perceptibly congested and filled. If the lesions were allowed to persist for 24 hours or more, edema and muscular tension were readily palpable. Where a lesion was present for 2 or more years, a general increase in connective tissue was found, such fibrosis forming a contracture of the muscle. These contractured areas have been found by every osteopathic physician when treating his peptic ulcer patients.

Lesions produced at the second dorsal vertebra caused a rapid and feeble heart beat with weak, shallow, and rapid respirations. There also was a fall in blood pressure. No gross digestive symptoms were noted. However, when these animals were killed, the gastric acidity was found to be as low as 0.1 per cent, the normal being over 1.7 per cent.

Animals lesioned at the fifth thoracic segment showed no gastric atony but did show erosions and ulcerations of the gastric mucosa and hyperchlorhydria.

Lesions from the third to the sixth thoracic vertebrae and corresponding ribs have been considered by many writers as etiological factors in peptic ulcer. Meyers[4] reported a case of peptic ulcer of long standing that was markedly helped by correction of a fifth thoracic lesion and marked spasticity of the neck. Muttart[5] found cervical lesions as well as midthoracic lesions as causes of peptic ulcers; definite reflex contractions were found in these areas.

Pritchard,[6] in 1929, pointed out the importance of lesions other than those of the fifth to seventh thoracic vertebrae and stressed the importance of lesions of the upper cervical area as possible causative factors in peptic ulcers. Another writer, Curtis E. Decker,[7] agreed with these findings and emphasized the part played by vagus irritation, especially of the upper cervical segments, in the production of pylorospasm in small children.

Webster[8] spoke of the "death belt," or the region just below the diaphragm, in which are found the stomach, duodenum, liver, gallbladder and bile ducts, pancreas, spleen, kidneys, solar plexus, et cetera. He called attention to the fact that imperfect drainage, either lymphatic or venous, cannot help but produce pathological states in these organs and that aside from any bony lesion, the action of the diaphragm is the greatest single factor in influencing venous and lymphatic drainage in this area.

Burns,[9] in 1928, summarized results of experiments as follows:

Guinea pigs, rabbits, cats and dogs have been used in the study of the effects of various lesions. Lesions of the fifth to the seventh thoracic vertebrae always cause rather marked effects upon the stomach like those described in this report. Lesions of the fourth, ninth and tenth thoracic vertebrae cause similar but less marked effects upon the stomach. Lesions of the third thoracic vertebra and of the vertebrae above this, and of the eleventh thoracic and of vertebrae below this, do not cause recognizable immediate effects upon the gastric circulation, secretion or peristalsis. Lesions of the vertebrae above the third thoracic, and below the eleventh thoracic may, however, cause changes in the gastric structure and functions after a considerable interval. . . . Lesions of the cervical vertebrae and the upper ribs have not yet been thoroughly studied; no doubt these lesions may produce certain gastric changes also.

In a later article[10] she wrote as follows:

Since gastric ulcers occurred only in guinea pigs and rabbits with fifth or fifth and sixth thoracic lesions, and since all animals who had these lesions present for half a year or more had also gastric ulcers, it may safely be concluded that such lesions are the essential cause of gastric ulcer in the animals mentioned.

Further study is required in order that the relationship between these lesions and gastric ulcer in the human subject may be definitely determined.

In the study of peptic ulcer the entire spine, from the occiput to the sacrum, must be taken into consideration, not overlooking the effects of postural defects in the etiology. Faulty habits of lying, sitting, or standing affect the diaphragm, the liver, and the mesenteric supports of the stomach. Postural defects due to primary bony framework imbalances, such as congenital or acquired short leg, may result in lesioned areas or predispose to muscular contractures in the lower dorsal area.

Kyphosis produced by faulty sitting posture produces a compression of the abdominal and thoracic viscera with interference with normal blood supply and venous drainage. The lordotic individual, with a pendulous abdomen and sagging abdominal viscera may also have similar interference with normal nutritive processes.

Ussher[11] speaks of the somatic triad—the skin, dorsal musculature, and vertebral articulation—as the etiological factor in many cases of visceral disease. He found postural defects in his group of patients with abdominal disorders; the majority presented pelvic tilt with short leg. Raising the heel on the side of the short leg seemed to be standard treatment. He stressed the great need for correction of the postural defect in order to obtain relief from the visceral defects.

One of the outstanding symptoms of peptic ulcer is pain. It may be of definite help in the diagnosis of ulcer, its location, and its complications. The pain of peptic ulcer may be felt in the back instead of the epigastrium. If the pain is severe, it usually indicates an ulcer on the posterior wall of the stomach. Perforation of an ulcer, allowing the escape of air, produces pain in the cervical area and the shoulder. The diaphragm is supplied mainly by the fourth cervical nerve and to a lesser extent by the third and fifth cervical nerves. They transmit pain from the diaphragm through the somatic afferent fibers to the shoulder and cervical area.

Kadish and Rivers[12] state that gastric ulcers often produce pain felt in the left side of the epigastrium,

or it may be referred through to the back or laterally to the back. The pain, which may be very severe, is most often felt to the left of the lower thoracic portion of the spine. Pain extending into the left shoulder and neck is evidence of deep penetration of the ulcer with involvement of tissue with phrenic innervation.

Pain of duodenal ulcers is felt in the pit of the stomach or to the right of the mid-line just above the umbilicus. If the pain extends to secondary regions it usually extends to the right costal region, into the thorax, or around to the back usually at the level of the ninth and tenth thoracic vertebrae to the right of the spinal column.

Bentley[13] describes experiments with patients suffering from peptic ulcer. He injected procaine into the anterolateral aspect on each side of the body of the first lumbar vertebra. Epigastric pain was abolished due to splanchnic nerve anesthesia. The peritoneal nerve supply had not been affected so that the tenderness could not have been due to irritation of the anterior parietal peritoneum by the ulcerated viscus. He concluded that the pain was due rather to the ulcerated area itself being the site of the pain, or that it was due to pressure on hypersensitive areas in the abdominal wall. Further experiments led him to conclude that the pain arose directly in the ulcerated stomach.

Patients suffering from peptic ulcer may be able to do a full day's work without any undue discomfort or pain, but may suffer much pain at night and may even require opiates for sleep. Bowing the back often gives them considerable relief, or it may be necessary for them to get up and sit in a chair. This may be the first symptom of intra-abdominal pathology and may be the outstanding symptom throughout the disease. This pain can be differentiated from orthopedic conditions in that motion gives relief and there is no radiation to the extremities and no limitation of motion. It is poorly localized and is cramp-like. Osteopathic manipulative treatments do give these patients relief, at least temporarily, but must be given rather consistently. Usually there are "lesioned areas" which are reflex, secondary, or viscerosomatic in nature.

Tumen and Yaskin[14] postulate that abdominal viscera are supplied with sensory nerve endings and that the impulses from these organs travel over the splanchnic, hypogastric, and pelvic nerves to enter the spinal cord over the posterior roots. They believe that this is the route by which the pain is transmitted from the viscera.

Following along this line of thought and more or less in corroboration, Sinclair, Weddell and Feindel[15] state:

> The logical development of the whole argument of this paper is that each viscus has its own representation of somatic terminals in the skin and a similar though less dense representation in the deeper tissues. If this is so, then it must be expected that impulses arising at the somatic terminals must find their way in an anti-dromic direction to the visceral terminals, and by there liberating a chemical substance, produce a series of effects in the viscus concerned. It is intended to develop this point in a subsequent communication, but it may perhaps be noted here that not only would such a mechanism be of the greatest importance in explaining many clinical phenomena, such as the initiation of anginal attacks by the application of pressure to the left arm (Robertson and Katz, 1938) but it could afford a rational basis for the practice of applying heat or counter-irritants to the skin overlying an inflamed viscus (Sturgis, 1883).

CONCLUSIONS

Osteopathic lesion pathology seems to have a very definite place in the etiology of peptic ulcer. While not necessarily the only causative factor, it is one which the older school of healing has overlooked but which doubtless will be brought more and more to the foreground in the near future. It is very essential therefore that the osteopathic physician does not overlook and ignore this phase of peptic ulcer which is becoming so prevalent.

It cannot be denied that postural defects predispose to lesion pathology and greater thought and attention should be given to the patient as a whole, both in diagnosis and treatment.

Research from the standpoint of the osteopathic concept of the lesion as a causative factor in peptic ulcer in human beings is definitely indicated and needed.

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FRACTURES

Although there have been many advances and changes in the methods of treating fractures due to the development of newer metals and appliances, chemicals and drugs, etc., the problem still is one of reducing and immobilizing the bone fragments until sufficient union takes place to allow the use of physical and occupational rehabilitation. The bones and joints of our forebears were of the same type and character as ours, and nothing has altered the basic anatomic and physiologic features of these structures or the changes incident to injury or disease. The newer means and wider range of travel, the use of more machinery, etc., in brief, the more complex and intricate existence of human beings these days, have caused the development of many more of the severer types of injury, such as comminuted and compound fractures, but a very great number of fractures still are due to falls, and leverage forces of various kinds.—Allen F. Voshell, M.D., *American Practitioner and Digest of Treatment*, January, 1950.

Osteoporosis*

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The term "osteoporosis" is one which we all use a great deal, especially those of us doing primarily orthopedic work. Although we each use the word to designate a definite type of bone condition, to our own way of thinking, it is amazing to find the variation of the meanings attributed to it in everyday use as well as in the literature. It has been applied to conditions ranging from rarefaction through softening and necrosis to replacement of bone structure by other tissues. It has been used to designate a specific disease.

It is apparent in the more recent writings that the term is being replaced more and more by specific and definite terminology, which classifies the pathology much more accurately than the mere term "osteoporosis." Thus, we find being eliminated the confusing use of osteoporosis to apply to a sclerotic disease of bone which is far more aptly called osteopetrosis or osteosclerosis.[1]

Osteoporosis as used in this paper will be a general term applicable to a syndrome of varied causes and with a variable pathological picture but with the prime associated link of "abnormal porousness or rarefaction of bone by enlargement of its canals or the formation of abnormal spaces."[2] The adjective osteoporotic will be recognized as signifying the presence of such a picture in bone and can be credited as being proper terminology when used to describe such a process on roentgen films or for clinical evaluation.

The description of weakening of bone due to rarefaction or softening has been found in ancient medical literature. In 1588 Marcellus Donatus described osteoporosis of bone due to cancer, syphilis, and infection.[3] In the eighteenth and nineteenth centuries various descriptions of osteoporosis were given, some of which are now disregarded and some of which are still recognized as valid to this day. In 1932 Michaëlis[4] described a generalized osteoporosis associated with multiple symmetrical fractures which develop gradually from small localized areas of more intense decalcification. The calcium balance is normal and the etiology is unknown.

The inclusion of the forms of osteochóndritis as variations of osteoporosis or aseptic necrosis of bone has been a frequent finding in the literature. Bick[3] in his "Source Book of Orthopedics" gives quite an extensive resume on the subject. According to him Köhler described a type of painful foot found in children in which the tarsal navicular was involved with aseptic osteitis. This has since been considered under the broad grouping of the osteochrondritides with Freiburg's disease, Scheuerman's disease, and Legg-Calvé-Perthes' disease. All of these are rather indefinite in etiology and pathology but for all there is given rather consistently the explanation of aseptic necrosis of bone due possibly to traumatic interference with the blood supply or possibly the effect of static imbalance due to increased stress or strain or decreased capacity to withstand stress or strain on the part of the rapidly growing bone cells.

*Presented at the meeting of the Osteopathic Academy of Orthopedists, Detroit, October 10, 1949.

According to Bick[3] osteoporosis of the spine with gradual compression of the involved vertebrae and subsequent formation of kyphosis following trauma was described by Kümmel in 1895. In his book on compression fractures he reported six cases of kyphosis which were not the result of a compression fracture at the time of injury, but in which there gradually developed compression of the involved vertebral bodies months after the trauma. He felt that the injury was sufficient to impair the blood supply, resulting in a form of aseptic necrosis and osteoporosis with subsequent wedging or flattening from weight bearing. Clinically related disturbances of the lunate and navicular bones of the carpus were reported on Kienböck and Preiser respectively. In 1900 Sudeck first brought out his description of localized post-traumatic atrophy of bone. This bears some relationship to the entities mentioned above but the pathology is somewhat different. It will be discussed later in this paper.

Also related to the post-traumatic syndromes is the relatively frequent result of aseptic necrosis of the talus after arthrodesing operations. Ransohoff described a type of extensive osteoporosis of the long bones following fracture in contradistinction to the type described by Sudeck which developed in the wrist or ankle or hand or foot. The involvement of the shaft of a long bone apparently was the result of definite injury to the nutrient artery with massive circulatory impairment. Another type of post-traumatic atrophy of bone is that described by Turner, in which there is neural involvement with a traumatic neuritis rather than gross circulatory disturbance. Oserov reported a comparable case.[3]

The finding of aseptic necrosis and osteoporosis of the neck and head of the femur, following fractures of the neck of the femur, is so common that it does not justify too much attention. We have all run into this phenomenon, which is thought to be the result of massive interference with the scanty blood supply to this part of the femoral bone. Regardless of the exact mechanism, which to this day is still conjectural, we know that this is one site in the body where healing of fractures is dubious and disintegration of bony substance and structure a very definite hazard.

It would be extremely difficult to classify the various forms of osteoporosis as to specific types. As has been said, we are dealing with a descriptive term rather than a pathological entity. For the benefit of organization we may consider the varieties of the process to fall into an etiological and pathological classification. The etiology of the condition is usually some primary disease or trauma to the part involved or to some distant site or structure. In the local processes the pathological picture may vary, whereas that which results from some distant cause presents a rather typical appearance. Osteoporosis has been found as an end result following:

Trauma to a Part.—Osteoporosis has been found following fractures of the femoral shaft and neck,[1,5] dislocations,[5,6] malunion of fractures, ulceration over bone,[7] and osteochondritides.[3] Sudeck's atrophy or spotty osteoporosis develops following trauma.[1,5]

Disuse of a Part.—Osteoporosis results from immobilization in a cast or splint[5,6,9,10] or from lack of use in anterior poliomyelitis, paraplegia, ankylosis, and hysteria.[1,5,6,10]

Trauma Distal to a Part.—Osteoporosis may result from damage to the nutrient artery[3,8] or injury to the peripheral nerves[1,3,7] or the spinal cord.[11]

Local Diseases.—Osteoporosis is seen in osteomyelitis, benign and malignant tumors, syphilis, pressure necrosis,[1] and Gaucher's disease.[12]

General and Systemic Diseases.—Osteoporosis may occur in atypical inflammatory polyarthritis,[13] familial hepatic cirrhosis,[14] potassium thiocyanate therapy,[15] progressive muscular dystrophy,[16] familial atrophy of bone,[17] renal rickets,[18] dietary deficiencies of calcium,[6,19] rickets,[1,6] scurvy, paresis, cachexia, and chronic wasting disease, phosphorus poisoning,[1] locomotor ataxia, syringomyelia, hemiplegia,[1,5] celiac disease and sprue,[6] Paget's disease, hyperthyroidism (especially thyrotoxicosis), leukemia, particularly in children, hyperparathyroidism (osteitis fibrosa cystica), and basophilism.[20] It may also be due to cold[21] or senility[5,6] and it occurs in the postmenopausal period.[20] Idiopathic osteoporosis is found in children.[6]

The listing as given above will give some idea of the generalized character of this pathological finding. It is associated with all the diseases listed in a marked or mild degree. There is no doubt in my mind that there are other so-called disease entities which also involve osteoporosis, but in which it has been overlooked.

Prolonged recumbency, including immobilization in splints and casts, is a frequent cause of disuse atrophy of bone and decalcification. It usually affects the end of bones, close to the epiphyseal zone, and cancellous bone. Eventually the cortex is absorbed by disappearance of the lining bone of the marrow cavity, with subsequent enlargement and widening of the marrow cavity. The joint spaces are not narrowed in contrast to the atrophy resulting from arthritis. In the latter there is also decalcification and osteoporosis of the terminal portions of the long bones but the joint spaces are very definitely narrowed. Keeping this point in mind is very important in relation to the resumption of activity in the patient who has been immobilized for a long period. Stress and strain must be avoided to eliminate the possibility of fracture in weakened areas.

This factor of disuse is brought out in the recent work of Abramson,[11] who stated:

> The loss of bone density in motor paralysis is well known. The phenomenon of atrophy is commonly observed in paraplegia, where, with the passage of time, the bones below the level of the lesion undergo a greater or lesser degree of decalcification.
>
> In differentiating osteoporosis (used in the strict sense of disuse atrophy) from other conditions producing bone atrophy, the outstanding criterion is that the blood serum calcium, phosphorus, and phosphatase are normal. In his series, Soule showed this to be true. In osteoporosis there is no disturbance of the deposition of calcium into the bone matrix; but the laying down of the bone matrix itself is deficient.... It would seem that disuse is the major factor, if not the only factor, in the production of atrophy in paraplegia.

The disuse theory also plays an important part in the production of bone dissolution in peripheral nerve injuries. Bone changes caused by experimentally produced peripheral nerve injury in the cat were studied[7] and the results were as follows:

> These experiments indicate that atrophy of bones does not result from denervation of any extremity or from immobilization of a denervated extremity. When atrophy of bone was observed, in rare instances, it occurred as the result of ulceration overlying a bone or joint. When ulceration occurred in an extremity which had been denervated and immobilized, it was more severe than in cases in which the extremity had not been immobilized, and a greater number of cases of bone atrophy occurred.

It is not infrequent to find generalized bone atrophy following cerebral injuries with paralytic deformities. This may also fall in the category of disuse atrophy without any specific bone changes as the result of nerve pathology. Osteoporosis from the chronic wasting diseases, cachexia, insanity, paresis, locomotor ataxia, hemiplegia, and syringomelia may also be considered under this mechanism of production, although the question may be raised as to the interference with trophicity in these conditions as has been done with reference to peripheral nerve injuries. In anterior poliomyelitis, in the early period of immobilization, there is an extreme degree of decalcification of the skeleton. In spite of this, fractures, when they occur, unite satisfactorily and rapidly.

Generalized demineralization of the skeleton is not uncommon after 60 years of age. This is called senile osteoporosis. Characteristically the bone trabeculae are absorbed and there is thinning of the cortical bone; the joint spaces are slightly narrowed but there is no erosion of the articular surface. This phenomenon is not specifically linked to chronological age. A person's physiological age may be greater or less than his calendar age. Thus many elderly patients have well calcified bones, and occasionally generalized decalcification of the senile type occurs in individuals in the fifth decade. The factor of senile osteoporosis may have an important etiological bearing on the notorious femoral neck fractures. Frequently cupping of the vertebral bodies resulting from pressure of the intervertebral disks is a spinal manifestation of this form of osteoporosis in the elderly.

The effect of diet on this state is of vital importance. The American diet is thought to be definitely suboptimal in respect to calcium intake. As a matter of fact the presence of femoral neck fractures in the elderly, along with senile osteoporosis, may be the result of prolonged deficiency of this element over the lifetime of the individual. The Food and Nutrition Board of the National Research Council has recommended that the daily allowance of calcium, for the adult, be increased from 0.8 to 1.0 mg. A low-milk diet will be deficient in calcium. Stare has said, "It was a surprise to see that the majority of roentgen studies on adults past the age of 45-50 years showed considerable demineralization of bone and one wondered whether low dietary intake of calcium or vitamin D, over many years, might not have been a prominent causative factor in the decalcification."[22] Where the diet contains small amounts of calcium in comparison to the needed quantities, there will be a gradual drawing of the mineral from the bones by the blood to meet the body demands. Since calcium metabolism is a slow process in the adult, there will be a progressive weakening of the bones over the years. Adequate intake of calcium should tend to minimize the onset of senile osteoporosis and decrease the number of fractures in elderly persons.[22]

Osteomalacia is actually considered a softening of bone, but its place in the over-all grouping of

porotic lesions of bone, or weakness of skeletal system, cannot be questioned. It is thought that in osteomalacia there is a dietary deficiency comparable to the deficiency of rickets. This may or may not be related to the hunger osteopathy of Looser or the generalized osteoporosis with multiple fractures presented by Michaëlis. It is often associated with pregnant and lactating women in the age group of 20 to 40, but senile forms do occur in both males and females. The greatest incidence is in India and China but it is now known that a mild degree is not uncommon in North America. On examination there is disproportion and deformity to the pelvis giving the typical aberrant walk or duck waddle. Of course the case is well advanced before the latter symptom is present, but in the early case backache and pain on motion are common.[20] The compact bone is absorbed, producing a thin cortex, and the density of the radiographic shadow becomes hazy and may be reduced to that characteristic of the soft parts. The trabecular structures of bone become rather coarse. Multiple fractures with poor callus formation and curvature of bones result. The blood serum calcium drops as low as 5 mg. per cent and the phosphorus is also low. These findings distinguish the disease from the somewhat similar changes of hyperparathyroidism, in which the blood calcium is raised. Also cystic changes are more marked in the latter.[6] The condition must be differentiated from senile osteoporosis, Paget's disease, and rickets. It does not affect the skull as does Paget's disease and it occurs too late for rickets. In senile osteoporosis the blood values for calcium, phosphorus, and alkaline phosphatase are normal. In Paget's disease the blood alkaline phosphatase is high. Biopsy showing a large amount of osteoid tissue is considered pathognomonic of the disease. In cases coming on during pregnancy the prognosis is good, and frequently there is improvement after the climacteric. In the nonpregnant types, massive deformity, distortion of the skeleton with many fractures, and progressive pain produce bedridden invalids and eventual death.

Rickets is another disease in which porotic lesions of bone and weakening of the skeletal system are found. It is due to a deficiency of vitamin D, either through a dietary lack or the failure of exposure of the skin to sunlight which converts the sterol of the skin to vitamin D. The vitamin is the prime factor in the absorption of phosphorus and calcium from the intestinal tract. When it is lacking the skeleton becomes decalcified. Other diseases which also reveal the picture of bone porosis due to digestive or dietary aberrations are celiac disease, idiopathic steatorrhea of adults, and tropical sprue. In the latter three there is imperfect digestion and absorption of fats with diarrhea. The actual bowel movement is very large and rather pale in color. The amount of split and unsplit fats in the stool is far above average. Because of this there is formation of calcium soaps, rapid passage through the intestine and bowel, and the amount of calcium and phosphorus absorbed is almost nil. Tetany is a frequent clinical finding, as well as marked porosis of bone with bending of the osseous structures and many fractures. The union of these fractures is poor unless the underlying pathology is corrected. Immobilization may have to be carried on for months.[6]

Osteoporosis of a generalized nature may be found in children who do not show evidence of any of the usual disease entities which produce rarefaction of bone. This is considered the idiopathic osteoporosis of children. Children with this condition are free of rickets, celiac disease, blood dyscrasias, and hyperparathyroidism. The blood calcium is within normal limits but there is an upset of the calcium balance of the body and calcium excretion is greater than calcium absorption. The bone cortex is thinned and the trabeculae absorbed with the production of pathological fractures. Helfet gives the explanation that the syndrome is the result of a derangement of the phosphorus metabolism producing a lack of balance between the calcium and phosphorus of the blood. A high blood phosphorus stimulates the parathyroid glands to overactivity and calcium is liberated from bone to form calcium phosphate. The latter is excreted with the resultant depletion of bone calcium. If the phosphorus is precipitated in the intestinal tract by giving alum acetate by mouth, along with a high dietary intake of calcium, the calcium balance will be restored and the bones recalcified.[6]

Gaucher's disease has a part in the production of pathology in bone tissues of the body. A number of cases of this disease have been found to exhibit rather characteristic findings of aseptic necrosis of bone. This has been explained on the basis that the Gaucher's cells surround and infiltrate small arteries and capillaries and thus may cut off the circulation. On x-rays and from the clinical course, the picture resembles that of aseptic necrosis of bone of known etiology.

Children with leukemia present osteoporotic lesions. In those bones where the growth is rapid there is an area of diminished density just proximal to the metaphysis. This may be confused with roentgen findings of scurvy. Occasionally generalized osteoporosis may be found with areas of cortical absorption and softening. This is the cause of the rare pathological fracture in the young leukemic patient.[20]

Basophilism also presents its share of osteoporotic lesions. The area most usually involved is the vertebral column, where the bodies become porotic. The bone below the marginal plates shows increased density and the vertebral bodies are seen to be indented from the expanding intervertebral disks.[20]

Increased activity of the parathyroid gland produces definite effects on the skeleton which are porotic in nature. Osteoporosis with severe bone pain and tenderness, spinal curvatures, and pathological fractures are typical. The skeleton may reveal diffuse osteoporosis, acute bone atrophy, or generalized osteitis fibrosa cystica with giant-cell tumor.

Osteoporosis circumscripta is limited to the skull. The lesion consists of single or multiple areas of osteoporosis which are sharply outlined in the cranium. Infrequently dense bone may be found associated with and within the osteoporotic zone. This is considered by some to be a form of Paget's disease. There are cases of osteoporosis circumscripta in which characteristic pathology of osteitis deformans is found in other bones of the body. Sosman considers this entity an early stage of Paget's disease. His thought is that the lesion of osteoporosis circumscripta is the monophasic type of Paget's disease while the typical syndrome of osteitis deformans is biphasic with bone absorption and very dense bone both being present.[20]

Hyperthyroidism produces a marked increase in calcium excretion, sometimes as high as eight times that of normal. Blood calcium and phosphorus are normal. Generalized osteoporosis frequently results.

The spine and small bones are affected first and later the long bones become involved. Kyphosis of the spine with compression fractures of the vertebral bodies can occur along with spontaneous fractures in the long bones. These patients suffer with a great deal of pain. The bone changes are dependent upon how long the disease has been present, rate of calcium loss, and daily calcium intake. Thyrotoxicosis is usually present for 4 or 5 years before any skeletal changes become evident. There may be improvement both clinically and roentgenologically with treatment to the underlying exophthalmic goiter.[20]

Postmenopausal osteoporosis is now a definitely recognized condition. Albright and his co-workers[23] have done a large amount of work on this phase of osteoporosis. The conclusions based on forty-two cases studied by them are as follows: ". . . the chief argument for the existence of postmenopausal osteoporosis, other than the beneficial effects of estrogen on the calcium metabolism in these cases, is the frequency with which osteoporosis occurs in women after the menopause. Two of the cases were men in whom no explanation for the osteoporosis was apparent. The average time of onset of symptoms after an uncomplicated physiologic menopause was nine and one-half years."

The bones most commonly affected by postmenopausal osteoporosis are the spinal segments and the pelvis. The skull is not affected and the long bones are involved only rarely. Here too the spinal lesion presents compression of the vertebral bodies with wedging and sometimes herniation of the intervertebral disk through the vertebral end plates. The fact that this form of porosis is restricted to certain locations and never involves the skull makes it rather easy to differentiate from that resulting from hyperparathyroidism. These patients apparently have a premature aging of all the mesenchymal tissues with early degeneration of other systems of the body.[20]

Infective decalcification is the result of the presence of a localized or adjacent infective focus in the bone with the production of osteoporosis. In acute osteomyelitis hyperemia and infection are present and this type of rarefaction occurs. Fracture may result unless the limb is supported. Such a fracture must be considered as compound and treated as such. Decalcification may be the result of a neighboring inflammation, not actually in the osseous tissues. Throat infections may produce a spreading hyperemia with rarefaction of the atlas, enough to permit separation of the transverse ligament. This may actually be the cause of spontaneous dislocation of the atlas. Because of the looseness of the ligament, the atlas slips forward and dislocates or subluxates. It is an incomplete dislocation and may be easily reduced. Recovery is expected after plaster of paris immobilization for 2 or 3 months. In some cases instantaneous death results from cord pressure.[6]

Localized atrophy following injury is, in many instances, the apparent result of disturbance in blood supply. This is particularly true following fractures. Examples of this are seen in the intracapsular fractures of the neck of the femur in which the atrophy is occasionally so extensive that the entire head is absorbed. Infrequently this same process involves the long bones. Trauma to the knee may present no damage apparent on x-ray study for several weeks. Then roentgen examination may show well defined areas of osteoporosis of the patella and femoral condyles. These areas of rarefaction may become very marked during immobilization of the leg for fracture.

Sudeck described a localized atrophy of bone associated with an inflammatory process in the articulations which he later called post-traumatic reflex atrophy of bone. Keinböck gave further information on the syndrome and added the roentgen findings. This condition is also called post-traumatic acute bone atrophy, acute atrophy of bone, spotty osteoporosis, and acute painful osteoporosis. It may follow the malunion of fractures of the wrist or trivial injuries of the wrist or ankle. At its onset there is swelling of the soft tissues with tenderness and pain on motion. As the pathology progresses, circulatory changes take place in the soft tissue and bone. The skin becomes dusky and cold and perspires a great deal. Marked decalcification of bone, atrophy of the soft tissues, and trophic changes in the skin occur. There is actual loss of bony substance and not simply depletion of mineral salts. In a few cases acute bone atrophy comes on very shortly after the trauma. This type of osteoporosis is most frequently found in the small bones of the hand and feet; next in order of frequency are involvements of the epiphyses of the metacarpals, metatarsals, and phalanges, and finally the epiphyses of the long bones. As the pathologic process continues, the fingers and wrist become increasingly stiff. Even the elbow and shoulder may become secondarily involved from holding the extremity in one position with voluntary immobilization. X-rays show a mottled decalcification of bone.[3,7]

Although these cases of osteoporosis may be found in association with nerve injuries, they are not the end result of damage to either peripheral nerves of extremities or nerve trunks. Hermann, Rienke and Caldwell reviewed the work from various clinics on this syndrome; they found that peripheral nerve injury, as apart from general trauma, played little or no part in its production. It is actually thought to be the result of the setting up of a reflex arc with resulting localized hyperemia and bone absorption.[7]

The treatment of osteoporosis resolves itself in the treatment of the underlying disease if one is present. The cases which are the result of immobilization or disuse cannot be treated in any specific manner aside from the institution of free and unlimited motion of the part. It is wise at times to eliminate splinting or casting of a joint to permit adequate movement and thus prevent the porotic lesion from developing. In those cases of paralysis in which osteoporosis is present, there may be no therapy available to diminish the progressive demineralization, although simple physiotherapy in the form of contrast baths, whirlpool baths, passive motion, and massage may be of help. The institution of an adequate diet, with optimal calcium intake, is definitely indicated along with a well rounded vitamin regimen.

Rickets and scurvy are specifically treated with vitamin D and C, respectively, along with adequate fresh air, sunshine, and physiotherapy. Sprue, celiac disease, and steatorrhea are treated by having the fat intake diminished to 50 or 60 gms. daily and oral administration of hydrochloric acid to relieve the associated achlorhydria and to promote calcium absorption. Calcium gluconate is given by mouth or injection. Alum acetate has been used in the idiopathic osteoporosis of children and in the rarefying lesions of Paget's disease.[6] In osteomalacia dietetic treatment is indicated along with increased calcium intake and the

administration of ergosterol. In many of these softening and rarefying lesions of the skeleton, not the result of disuse or trauma, the advisability of splinting or bracing to protect the patient from fracture should be considered. In some, in which fracture has already occurred, prolonged immobilization may have to be utilized. Sympathectomy has been used for senile and disuse osteoporosis.[3] Thyroid extract has also been used in cases of these types.[1] The opposite is true where the porosis has been proved to be the result of hyperthyroidism and treatment consists of correction of the entire syndrome by thyroid surgery or antithyroid medication. Estrogens are indicated in postmenopausal osteoporosis and the androgens may have some degree of value in presenile osteoporosis in the male.

Porosis of bone resulting from fracture as in the femoral neck group, shaftal fractures with nonunion from osteoporosis, and pathological fractures in the porotic lesioned areas may all require surgical intervention. In these cases the use of either cancellous or compact bone grafts may have to be considered, along with any form of internal immobilization which may be utilized.

Acute post-traumatic atrophy of the bones of the hand is a true orthopedist's dilemma. Treatment here consists of not letting it happen. The wrist of an adult should never be immobilized in a cast for longer than 2½ to 3 weeks. The patient should then be ordered, coaxed, and cajoled into using his hands as much as possible. He should not be permitted unlimited use, but active motion with no weight bearing or lifting should be encouraged. The cast or immobilizing device should always be checked to be sure it is not too tight. The patient is instructed to move his fingers, elbow (if not included in the cast), and shoulder from the first day of the reduction until the cast is removed, when active exercises should be instituted. Of course a good reduction with a minimum of trauma is the first vital step in the elimination of this complication. The fingers or joints of the hand should not be actively stretched by manipulations, but the physician should always insist that the patient actively move the parts, even if pain is present. Once the condition is recognized as being present, therapy should be more vigorous. Frequent massage with olive oil to the part is advisable. The use of heat in these cases is questioned, since diathermy and epsom salt baths induce a hyperemia and thus would be thought to increase the tendency to osteoporosis. Some physicians do use heat. Roentgen therapy has been suggested. Ganglionectomy and sympathectomy have been utilized.[1,6] The latter may be a periarterial sympathectomy of the brachial artery or a higher approach may be made. In any event, I believe that if the condition is averted by proper supervision or picked up early in its onset, vigorous treatment may avert the calamity of a stiff, useless, and painful hand.

Osteopathic manipulative treatment directed to the segments of the spine associated with the nerve supply to the involved extremity or area is indicated in osteoporosis. Unimpaired and unrestricted motion in these segments with the elimination of osteopathic lesions will lend vital support to the diminution of the demineralization and porosis. A faulty reflex arc may be corrected by this measure and impaired circulation will be assisted in its attempt to return to normalcy.

In conclusion, I wish to reiterate that in dealing with osteoporosis we are not dealing with a disease entity but with a pathological descriptive term. I have tried to consider its many ramifications in the variety of diseases and injuries in which it is found. I have attempted to cover the therapy briefly for many of the conditions in which it occurs.

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ASPECTS OF PHYSICAL RECONDITIONING

Conservation of manpower and the gainful existence of the individual following orthopedic injuries and disease are attained not so much by the restoration of function, as by continually preserving function. Thus, in the initial treatment of fractures, reduction of the bone fragments should not be paramount, but rather the decision as to the most rapid method of restoring the whole individual to a functioning, economically solvent capacity. Surgical repair and treatment should be based on a program which will adequately immobilize the injured part, and at the same time maintain good tissue turgor and a properly functioning vascular tree, and allow early active exercise. In operative cases, it is as much the surgeon's responsibility to impress upon the patient the importance of postoperative care and proper muscle re-education as it is to employ good surgical technique. Each patient who faces more than a few days of convalescence should be given a detailed schedule of active rehabilitation,—especially a program of remedial exercises.—Marcus J. Stewart, M.D., *The Journal of Bone and Joint Surgery*, April, 1949.

Preoperative Preparation of the Surgical Patient*

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Preoperative preparation of the surgical patient is not a specialty in itself, but the coordination of information and the institution of therapeutic measures from all the branches of the science of medicine. There is an evolutionary background responsible for our present-day concept of this subject. A brief review of the history of surgery is worthy of report in that it develops a sense of responsibility within us regarding preoperative preparation.

The history of surgery may well be classified into three important eras. The first covered the period from the beginning of recorded time to the midportion of the nineteenth century. Mysticism and empiricism marked the trend. Surgery was performed in rare instances. It was done without anesthesia upon restrained subjects. Speed was the prime factor in its performance, with little regard for trauma.

The second era extended from the mid-nineteenth century to the first decade of the twentieth century. During this interval anesthesia was discovered. Antisepsis, asepsis, hemostasis, minimum tissue trauma, and improved surgical technic came into the picture. Mortality and morbidity rates remained high, causing the avoidance of extensive and intricate surgical procedures. The advancement of surgery was inhibited mainly because the patient could not tolerate the anesthesia and surgery. With all respect to the advancements of this period, there was neglect in correlation of body physiology and disease entities.

The third era began in the early part of the twentieth century and is engulfing us. It is as yet in its infancy. It is not within our province to assume the credit for today's miracles in science. The individualists and thinkers such as Kocher, Halsted, Moynihan, and many others of the second era, through their efforts and influence, started the trends of our era. It was from them that the precepts for research in the basic sciences were derived. These men realized that the knowledge gained from such research would eventually bring about the synthesis and correlation of knowledge of disease and its relation to physiologic processes. Research, influenced by two great wars and the machine age, has made marked advances in all the sciences. Fortunately, the science of medicine has shared these benefits.

To date we have the advantage of:

1. *Blood and its substitutes,* which offer much in the treatment of shock, hemorrhage, and burns and for the replacement of blood loss and the correction of anemia in the preoperative preparation of patients.

2. *Nutritional studies* which supply data on the energy-yielding components of foods and for the computation of caloric values. The body's eleven basic food requirements may be met or their deficiencies corrected by diet or parenteral alimentation.

3. *Protein, fluid, and electrolyte studies* enabling us to control the buffer system regulating body pH, to support metabolic processes, to govern water balance, and to institute prophylactic measures against shock and postoperative morbidities.

4. *Chemotherapy.* Even to enumerate the agents would require more space than is available. Their true worth and real effectiveness are entirely dependent upon the doctor, his knowledge of the pharmacodynamics involved, and his understanding of the bacteriologic and pathologic conditions in which they are used.

5. *Anesthesia.* Newer agents and improved methods of administering them are now available. The field has been broadened with increased safety to the patient by such combinations as sodium pentothal and curare, cyclopropane and curare, continuous spinal anesthesia and cyclopropane and oxygen, and intratracheal anesthesia with the adjunctive use of suction or aspiration bronchoscopy.

6. *New physiological concepts.* Here again we find a field too vast to cover. Therefore, mere mention will be made of substances holding prominence in this field as insulin, vitamin K, and heparin.

7. *Therapeutic modalities* such as x-ray, radioactive isotopes, and radium.

8. *Diagnostic modalities* including x-ray, tag or tracer elements (isotopes), improved laboratory technics and precision instruments, and instruments designed for direct visualization of body cavities and for measurement of body functions.

9. *Ambulation.* Controversy may arise over placing ambulation in a preoperative preparation discussion. However, it is a physiological process inasmuch as the body is designed for motion and physiological activity is required to maintain body physiology. Certainly when physical activity ceases, pathological states intervene. Postoperative early rising has been proved conclusively to be valuable in its short period of use.

We, as osteopathic physicians, can readily realize the importance of correction of structural disorders preoperatively as well as in the presence of any disease entity. Alteration of the structure brings about alteration of function both locally and in associated segmental areas. This is brought about through viscerosomatic linkage of the autonomic and central nervous systems. It is justifiable, therefore, to postulate that the correction of structural disorders is essential in preoperative preparation. Osteopathic principles, which stipulate the necessity of re-establishing normal body function by correction of structural disorders, have much to offer in this third era of surgical history.

Preoperative preparation thus becomes the application of present-day diagnostic measures to each patient in the attempt to isolate the etiological factors causing the pathologic physiologies and, from these findings, determining the therapeutic course. The extent of the disease and associated patterns encountered will influence the therapy. The discomfort experienced by the patient, the risk of life, and the economic situation become influential factors in directing the course of patient care.

When necessary information concerning the patient has been obtained, prophylactic measures and therapeutic and supportive management are instituted. Apprehension on the part of the referring physician, the surgeon, or the patient frequently precipitates early surgery with serious postoperative complications and

*Presented at the Twenty-Second Annual Clinical Assembly of the American College of Osteopathic Surgeons, Detroit, October 10, 1949.

prolonged convalescence. In most instances, delaying surgery 12 to 24 hours allows the confirmation of diagnosis and permits the institution of proper prophylactic, therapeutic, and supportive measures, thereby reducing the risk to the patient's life.

It is well to remember that it is better to anticipate complications than to regret them. Further, it is well to remember this rule in the preparation of the patient—a patient not safe for an anesthetic is not a good surgical risk. The element of time is of the utmost importance. The time needed for preoperative care varies with each patient inasmuch as each is a separate entity presenting basically different problems. The extent of preparation is determined by the urgency for surgery. According to the degree of urgency, surgery is classified into four main groups: Emergency, moribund, exploratory. and elective.

Emergency Surgery.—True emergencies are rare. When life is in immediate danger which only surgery can minimize or correct the term is correctly applied. Instances of uncontrollable hemorrhage serve as the best examples. In many of these cases packing, clamping or temporary ligation will allow time for the administration of blood or its substitutes, thus abating the state of shock, enhancing the patient's ability to tolerate the anesthetic agents, and reducing the operative risk.

Moribundity.—This term is self-explanatory. The state of patients in this category must be improved if possible. The anticipated surgery must justify itself in that the benefit to be derived should outweigh the risk to life. States of dehydration and acidosis that may be associated should be rectified by correction of the body's water balance. Malnutrition and cachexia are frequent complications and may be remedied by parenteral alimentation or controlled diet.

Exploratory Surgery.—Each vear the justification for this tvpe is diminishing. The rapid advancement in the diagnostic and therapeutic procedures today make it so. In those instances when available means have been applied without establishing a diagnosis or when improvement has not been obtained by therapeusis, exploration is justifiable. For purpose of emphasis it must be reiterated that surgery should not be performed until supportive measures have been instituted. These should be based on anticipated pathology to be encountered.

Elective Surgery.—Bv far the largest, this group encompasses cases in which there have been established pathological entities which signify future discomfort or impending danger. Plastic or reparative surgery are also included.

Time must be taken for study and evaluation as well as for adequate preoperative preparation. Carelessness due to too rapid clinical study too frequently eventuates in postoperative complications. Blalock[1] best states the importance of preoperative evaluation in his statement, "Surgery must prove itself continually in that the benefits to be derived from operation must outweigh the risk of life, the discomfort, the loss of time and the expense."

Specificity in this article has been withheld purposely. the intent being solely to establish the background as well as the importance of adequate preoperative preparation. Those interested will seek out the fundamentals from the multiplicity of periodicals and texts available today. Inasmuch as each case is a separate entity, individuality can best be developed in preoperative management. Set routines published by many authors are their own trademarks; often they are not elastic enough to be adapted to the abilities or the equipment of others. Experience in handling numerous and varied cases will eventuate in improved management routines.

The importance of accurate tabulation of statistics on all preparation management cannot be emphasized too strongly. Frequent comparative examinations of these statistics will reveal "danger signs" which, if heeded, will act as guides to improvement in management. Teamwork on the part of the referring physician, surgeon, anesthetist, internist, pathologist, and roentgenologist will enhance as well as facilitate preoperative preparation. From this team no more than two, and preferably only one, should write all orders on the patient's chart. Countermanding orders that cause confusion among house doctors and nursing staff are eliminated. Frequently orders are neglected for fear that one physician will encroach upon the rights of another. The result is that the patient suffers neglect. Jealousy in giving out "trade secrets" by any member of this team cannot be tolerated. The patient must come first. The ultimate objective of preoperative management is to render a better service to the patient by minimizing the risk to his life, by lessening postoperative discomfort and morbidity, and by reducing expense through a shortened hospital stay and less loss of time from work.

In closing, let me say to every physician administering preoperative care:

Prepare each patient as if he or she were your own wife, child, father, or mother. Those you care for have similar loved ones. Do it for the love of your work; your income will take care of itself.

Proper and adequate preoperative preparation of every patient with its distinct advantages will make hospitalization an experience to be anticipated rather than dreaded. Patients have come to recognize the importance as well as the advantages of such care. Therefore, when they receive it they become welcome supporters of your hospital, your profession, and you.

SUMMARY

1. Preoperative preparation is not a specialty as such.

2. Its need has been developed after many years of trial and error by our predecessors. It is a heritage evolved through experience. Its need has been substantiated and its usefulness cannot be denied.

3. Each disease entity has associated pathologic physiologies. Evaluation of them and determination of associated ramifications are of great importance.

4. Correction of the associated pathologic physiologies as well as their evaluation are possible by present-day advantages such as:

   a. Blood and its substitutes
   b. Nutritional studies
   c. Chemotherapy
   d. Anesthesia
   e. New physiologic concepts
   f. Therapeutic modalities
   g. Diagnostic modalities
   h. Ambulation (as osteopathic principles are involved).

5. Each case for preparation is a separate entity. Therefore, routine procedures are often inadequate.

6. Surgery is classified into four main groups:

   a. Emergency
   b. Moribund
   c. Exploratory
   d. Elective.

Regardless of the classification, prophylactic and supportive measures should be instituted. Carelessness, apprehension, and haste eventuate in added risk to life and postoperative complications.

7. Tabulation of statistics is of prime importance in justifying preoperative procedures. Often "danger signs" are established by statistics.

8. Proper and adequate preoperative preparation is the first step to postoperative care.

9. Teamwork on the part of the referring physician, surgeon, anesthetist, internist, pathologist, and roentgenologist is imperative.

10. Those concerned in preoperative preparation of patients should remember:

a. A patient who is not a good anesthetic risk is not a good surgical risk.

b. Postoperative complications should be anticipated rather than regretted.

c. The benefits to be derived from the anticipated surgery must outweigh the risk to life, the discomforts, the loss of time, and the expense involved.

d. Each patient must be handled as if he were one's own kin.

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DISCUSSION

ARTHUR M. FLACK, JR., D.O., F.A.C.O.S., Philadelphia: A paper such as Dr. Ranney has presented, leaves one very little that can be said in criticism of his efforts. It is for this reason that I must admit to you all that I am in complete agreement with what he has given you here today. I think we can all agree that preoperative and postoperative management of patients is as much a part of the practice of surgery as is the performance of the actual operation. This must be so unless we, as surgeons, are to become mechanics. I would like to stress the need for adequate explanation in simple terms, to the patient and to the family of the patient, the need for moving slowly in most instances to avoid serious complications. People today seem to be a little more intelligent about things medical and surgical and usually a happier patient-physician relationship is established if some effort is made to explain the problem with which the doctor is faced.

Dr. Ranney has purposely avoided being very specific and has failed to stress some of the economics of surgical practice. I am certain that a great deal of the preoperative evaluation of patients can be carried out prior to admission to the hospital. This saves everyone money and time and prevents the overloading of available hospital facilities. Such things as adequate hydration, the correction of anemia, the normalization of blood chemical levels can all be carried out before the patient is admitted for operative therapy. Often, if there is adequate investigation of the deficiencies in various phases of blood chemistry and if these are properly managed and corrected, the need for surgical intervention may diminish to the point that operation may then be avoided.

To the modalities utilized in the preparation of patients, I would like to suggest the addition of the routine use of exploratory x-ray films of the chest. In Philadelphia these have proved to be of great value in the past several years, especially in the identification of pathologic states of the heart, great vessels, and pulmonary structures, which defects might have otherwise gone undiagnosed to produce serious or fatal postoperative complications. Most often, silent lesions are thus discovered and can be evaluated adequately before surgery is undertaken.

Again, I would add to Dr. Ranney's exposition the importance of adequate preoperative appraisal of the patient by an experienced anesthetist. Let me remind you that anesthesia is not taken but is given. A smooth, well-given anesthesia can prevent many postoperative complications.

Let me stress the author's suggestion that routines are inelastic and I think it is our innate tendency to fall into the error of their use. We must remember that every case is a separate entity. Patients are different individuals and equal only in their rights to life, liberty, and the pursuit of happiness. Individual appraisal of what every patient requires will not only be better for patient and physician but will reduce the economic loss of serious illness. We must all avoid the danger of over-treating. In conclusion let me state that to the admonition of "cut well—sew well—get well" as applied to the practice of surgery had better be added the precaution, "prepare well."

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THE RECOGNITION AND DIAGNOSIS OF DIABETES MELLITUS

The American Diabetes Association, as the first part of their drive for the early detection of diabetes mellitus, designated the week of December 6 to 12, 1948, as Diabetes Week. It has been estimated that there are about 1,000,000 identified diabetics in the United States. For each identified diabetic there is probably one with the disease undiagnosed, as demonstrated in the survey of the United States Public Health Department made in Oxford, Massachusetts, in 1947. The town had 4,983 inhabitants. Seventy per cent submitted to tests of the blood and urine, and for the 40 known diabetics 30 persons with unrecognized diabetes were discovered. If *all* inhabitants had been examined, the implication is that for each known diabetic there is an unknown diabetic. The number of potential diabetics is even greater, and it is conceivable that about 4,000,000 persons, or three per cent of our population, may eventually become diabetic.

The importance of early recognition cannot be overemphasized. Unquestionably the outlook is better for those whose treatment is adequately carried out from the incipiency of the disease. This represents, however, a very small group of the known diabetics. It is likely that a far greater number would be disclosed with widespread use of screening tests in educational institutions, factories, and business firms.—Bert F. Keltz, M.D., *American Practitioner and Digest of Treatment*, January, 1950.

Osteopathic Concepts in Psychiatry*

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Long before the founding of the first osteopathic hospital for the treatment of neuropsychiatric problems, Andrew Taylor Still stated that a large percentage of these conditions could undoubtedly be cured through osteopathic management.[1] A. G. Hildreth based his management of psychiatric problems entirely on fundamental osteopathic principles and all through the years of his practice he held steadfastly to his belief in the soundness of osteopathic theory. Although his theories at first were supported chiefly by clinical evidence, experimental studies in neurophysiology, neuroanatomy, and the related sciences have, in the ensuing years, produced a fund of laboratory evidence which supports the physical concept of the etiology of psychiatric disorders. It is the purpose of this paper to present a reaffirmation of these osteopathic concepts in the light of the supporting proof of these later experimental studies.

Before discussing etiologic factors in psychiatric syndromes with any group not primarily interested in psychiatry, a few orienting remarks are indicated. Most psychiatrists today believe that a multiplicity of factors are usually involved in any psychiatric condition, and that the behavior observed and the symptoms described are the result of the total response of the organism to the sum of these many factors. Writers give increasingly scant attention to classical descriptive psychiatry, and concern themselves more and more with the problems of total adjustment of the organism in its particular milieu. Recently, a four-dimensional viewpoint has been advocated for purposes of clinical study: somatic predisposition; sociopsychologic predisposition; psychologic precipitating causes; and somatic precipitating causes.[2, 3] The somatic causes of mental illness are being scrutinized with renewed interest. This interest is reflected in the appearance of a new book oriented toward physiological psychiatry,[4] and in the appearance of an increasing number of papers dealing with physical aspects of psychiatry in the periodicals of the specialty. Sargent and Slater[5] summarize this new attitude toward psychiatric problems: "We have, however, passed beyond the stage when the treatment of the mentally ill can be solely along psychological—or somatic—lines."

Present-day psychiatrists also have adopted the concept that in any developing maladjustment, there is no sharp line of demarcation between the normal and the psychopathological: the difference is one of degree and not of kind. All of us are at all times adjusting to various conflicts with varying degrees of success, but if the stress should become sufficiently great, or our resistance sufficiently low, any of us could develop a psychiatric disorder. This fact was most strikingly demonstrated by our marines on Guadalcanal in the recent World War, when under extreme conditions approximately 50 per cent of the personnel became psychiatric casualties.

*Presented at the General Sessions, Fifty-Third Annual Convention of the American Osteopathic Association, St. Louis, July 14, 1949.

It may be helpful to embody these concepts in a diagram:

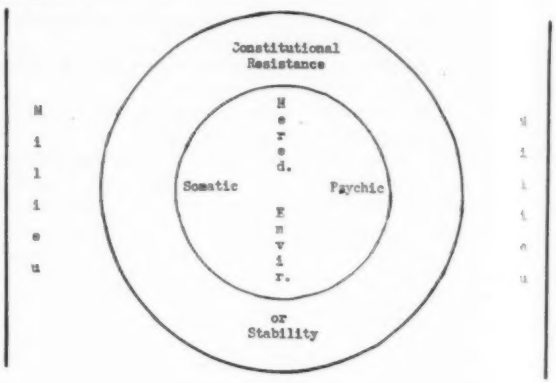

FIGURE 1

The figure represents a "normal" personality, bounded, or "held together" by the constitutional resistance or stability of a particular person. The personality is further pictured as being made up of four factors: mental, environmental, somatic, and hereditary. Admittedly, certain aspects of each of these factors cannot be so discretely delineated as here pictured, but I believe that all will agree to the presence of these factors in every personality however intertwined they may be.

Within limits, each of these factors of the personality may change; the components of personality are all variables. As in an algebraic equation, a change in one variable will affect the quality and quantity of all the other variables and obviously change the balance of the total personality in either a favorable or an unfavorable manner. Unless the change (or the combination of changes) is too great, the constitutional resistance tends to keep the personality together and in an acceptable even if unsatisfactory balance. This tendency of the human personality to retain its balance under unfavorable conditions has been discussed by psychiatrists under the term "homeostasis."

These personality factors have different degrees of variability. It will be generally agreed that the hereditary factors in a personality are least capable of change, but change is possible within narrow limits. Environment and the effects of environment on the personality are likewise capable of but little variation in many cases. It is in the mental and in the somatic factors of the personality that the greatest amount of change is possible. Of the two, all physicians will agree that somatic states vary with greater frequency and with greater ease than do mental states. We all know, for example, that man parts with his appendix less reluctantly than man changes his politics.

I stated earlier that the somatic factors of mental disorders are lately being studied with renewed interest. Symptoms which were once thought to be psychogenic have now been found to originate from

physical defect.[6] This is not to imply that psychological management will be or should be supplanted by physical treatment. Rather both are necessary and should complement each other. Psychotherapy is necessary before, during, and after physical treatment, not only in psychiatric but in medical and surgical cases as well. It is the purpose of this discussion, however, to consider and emphasize only the physical aspects of psychiatric management.

Certain illnesses characterized by mental changes, such as paresis, senile psychoses, alcoholic psychoses, et cetera, are generally admitted to be associated with demonstrable tissue pathology, and will not be considered here. We shall be concerned with the so-called functional psychiatric disorders: the group which is listed by Strecker and Ebaugh[7] under the heading: Disorders of Psychogenic Origin without Clearly Defined Tangible Cause or Structural Change. This grouping includes psychosomatic disorders, the psychoneuroses, and the major psychoses.

As I have elsewhere[8] presented material on the osteopathic pathology of psychosomatic disorders, it should be sufficient to quote from that paper the summary of the osteopathic considerations of importance in psychosomatic problems: (1) Altered visceromotor functions and skeletal tensions, with or without consequent altered vertebral relationships; (2) vertebral structural changes producing symptoms identical with "psychosomatic" syndromes; (3) pre-existing alterations of vertebral mechanics determining the organ or section of the body through which the anxiety will be expressed.

Among the psychoneuroses, there are three reaction types which are characterized by disturbances of somatic function: neurasthenia, hypochondriasis, and hysteria. In neurasthenia there are chronic physical fatigue and various organic complaints without evidence of organic pathology. Hypochondriasis is characterized by a variety of somatic complaints and obsessive concern for the general health. Hysteria characteristically shows alterations of somatic function: tics, paralyses, catalepsy, convulsions, paresthesias, and similar sensorimotor disturbances.

Psychiatrists in the osteopathic profession have always held to an osteopathic approach to both etiology and therapy in these psychoneuroses. Lesion pathology, it is believed, determines the organ or avenue through which the personality will find somatic expression for unresolved conflicts. Osteopathically we find evidence of altered vertebral mechanics in every patient with a clinical diagnosis of psychoneurosis. Spinal studies are, of course, made prior to the psychiatric examinations. Lesioned areas are found in close segmental relationship with the locus of spinal origin of the autonomic nerve supply to the involved organs or portions of the body.

The question may well be raised: Do the lesions come first? The question cannot be answered with any degree of certainty because we do not see the patients until the psychiatric syndromes are well developed. In specific instances which are rather numerous, we have been able to elicit information from either the patient or the patient's osteopathic physician indicating that the lesions did exist prior to the development of the frank psychoneurosis. This evidence, however, cannot be considered conclusive. J. S. Denslow[9] states that his investigations lead him to conclude that the presence of lesion pathology is sufficient cause for the production of muscular and visceral changes which result in the symptom picture known as neurasthenia. Mennell[10] also indicates that the syndrome of neurasthenia can result from structural changes plus the systemic and mental effects of these changes.

Speransky's work[11] suggests that the dysfunction may originate in a viscus or in a body part relatively far removed from the spine. Some minor disorder may initiate a change in the state of the nerve cells of the associated spinal segment or segments, and the change, once effected, tends to remain after the original cause has disappeared. Practically, it matters little whether the first or second method (or a combination of the two) was primarily operative in production of the clinical picture. Both will produce an area of chronic facilitation in the cord at the level involved and this area sends noxious impulses to higher levels. Even before these impulses become strong enough to be recognized as discomfort or pain, reflex adjustments have been effected in the way of both motor and visceromotor activities. The abnormal tensions resulting will, if they persist, finally be recognized at cortical levels. When this occurs the patient begins to complain of the viscus or part of the body from which the impulses originate and he usually complains of pain or discomfort in the associated vertebral muscles.

Failures in the therapy of the psychoneuroses are too frequently charged to a lack of "will" to get well on the part of the patient. They might be just as often due to the failure of the psychiatrist to give sufficient attention to the somatic aspects of the patient's problem. Through the years, the psychoneuroses have been treated at Still-Hildreth Osteopathic Sanatorium on the theory that the alterations of function were the result of altered structure. It is encouraging to see laboratory results which support our clinical findings and justify our therapeutic theories.

In considering osteopathic concepts in the etiology of the psychoses, I should like to present a table showing the locations and the relative frequency of osteopathic lesions found in a survey of 1000 cases of schizophrenia made by a member of the staff of Still-Hildreth Osteopathic Sanatorium in 1933.[12] The number of cases is large enough to forestall any criticism of insufficient number of cases for statistical evaluation.

TABLE I—LESION FREQUENCY IN SCHIZOPHRENIA

Lesion	Frequency
Cervical 1	37.6%
Cervical 2	66.0%
Cervical 3	41.2%
Cervical 4	6.7%
Cervical 5	1.7%
Cervical 6	1.0%
Cervical 7	1.2%
Dorsal 1	18.2%
Dorsal 2	25.3%
Dorsal 3	32.0%
Dorsal 4	54.5%
Dorsal 5	74.6%
Dorsal 6	67.6%
Dorsal 7	41.3%
Dorsal 8	18.7%
Dorsal 9	7.2%
Dorsal 10	21.4%
Dorsal 11	30.5%
Dorsal 12	36.2%
Lumbar 1	12.3%
Lumbar 2	3.2%
Lumbar 3	1.0%
Lumbar 4	.7%
Lumbar 5	2.7%

In the cervical region it will be noted that the first three segments show a lesion frequency of 37.6, 66.0, and 41.2 per cent respectively. The relationship of the superior cervical ganglion to these segments, and the role of the ganglion in the vasomotor control of the cephalic vessels make these lesions especially significant. In 1947 Karnosh and Gardner[13] found that endogenous mental depression could be relieved by bilateral procaine block of the stellate ganglion which altered the sympathetic nerve supply to the vessels of the head through the cervical sympathetic chain. The block resulted in relative euphoria and transitory relief from morbid ideation and psychomotor retardation. It is generally recognized among neurophysiologists that facilitation persists in a sympathetic ganglion for a relatively long time after stimulation from its preganglionic fibers. Lesion pathology in the cervical area provides this stimulation to the cervical sympathetics and a state of chronic facilitation of the cervical ganglia results. Normalization of the impulses to these ganglia by osteopathic manipulative procedures is a more natural and more rational method of therapy in psychiatric disorders than is the introduction of any foreign agent into the nervous system.

While the entire dorsal region showed a fairly high lesion frequency, the majority of the patients studied had lesions of the fourth, fifth, and sixth segments, with a frequency of 54.5, 74.6, and 67.6 per cent respectively. This relationship with the splanchnic nerves becomes significant in connection with F. M. Still's report[12] that 80 per cent of these patients were underweight. He gives the mean deviation as 15 per cent below normal.

At the time this study in schizophrenics was made, Still concluded that there was some disorder of metabolism associated with the psychiatric syndrome. In the report previously mentioned,[12] he also stated: "Nutritional and circulatory changes were very apparent as indicated by the loss of weight, rapid pulse and vasomotor disorders, and these (changes) are either caused by or influenced by the osteopathic lesions."

Keeping these diagrams and Still's conclusions in mind, I wish you to consider the osteopathic importance of a number of recent physiological and biochemical studies. To me these reports lend credence to a mechanistic theory of mental disorder.

It has been known for some years that psychiatric symptoms may be produced by various types of anoxia and that the mechanism of anoxia is relatively unimportant.[14] Cerebral anoxia may be produced by altitude, anemia, hypothyroidism, heart failure, or deficiency in one or more of the B complex group of vitamins, and in each instance, psychiatric symptoms develop which cannot be predicted in advance in the individual and which disappear when the anoxia is relieved.

Since interference with the normal oxygen-carbohydrate metabolism of the brain is a sufficient condition for the development of symptoms of mental disorder, the hypothesis may be advanced that anoxia may be a necessary as well as a sufficient condition for the development of psychiatric disorder. Recent studies in oxygen consumption in schizophrenics give considerable support to this hypothesis.

Hoskins and Sleeper[15,16] have shown by careful studies that there is a depression of the mean basal metabolic rate in schizophrenic patients, which is not due to the external environment.

Gerard[17] suggested in 1938 that shock therapy stimulates oxygen consumption and the same year Low and his associates[18] reported an increase in basal metabolism after metrazol shock treatment. Katzenelbogen and coworkers[19] also reported increased basal metabolic rates after electroconvulsive therapy and metrazol shock.

These reports present highly suggestive evidence that increased metabolism is the mechanism by which shock therapy produces favorable changes in the symptomatology of psychiatric patients. Direct and conclusive evidence on this point was offered in 1947 when Klein and Olsen[20] observed a calculated 80-fold increase in cerebral consumption of oxygen and glucose after any type of convulsive therapy in the cat.

Thus the physiological means by which shock therapy favorably alters cerebral function is the same as the physiological means by which osteopathic manipulative therapy favorably alters this function: increase of cerebral metabolism. The shock therapies accomplish this by severe, heroic methods: osteopathic manipulation aims at restoration of psychobiological balance by marshalling the forces inherent within the organism.[21]

It should be remembered that relatively small alterations in the basal metabolic rate—changes which are still within the "normal" limits—will produce a considerable increase in the number of calories per day available to the brain. For example, in a 32-year old man having a surface area of 2 square meters, a change in rate from minus 10 to plus 10 involves an increase of 384 calories per day. If 20 per cent of the total energy production is diverted to the brain (frequent estimate), the change means an additional 77 calories per day to the brain.[14]

The role of the adrenal cortex in mental disorder has also been under investigation in recent years. Anderson and Parmenter[22] have successfully treated experimental neuroses with adrenal cortex, and promising clinical experiments have also been reported by Hartman and coworkers,[23] Hemphill and coworkers[24,25] and others. It appears likely, therefore, that adrenal cortex does play an important role in mental disorders and Danziger and Kindwall[14] suggest that the administration of adrenal cortex in mental disease is rational therapy. That fits in concisely with the osteopathic concept and appears to provide an experimentally proved explanation for the clinically recorded incidence of osteopathic lesions of the eleventh and twelfth dorsal segments in the Still survey.

It may seem remarkable that the lumbar region was infrequently lesioned in schizophrenics, considering the relative frequency of low lumbar problems in general practice. But the fact of low lesion frequency here only lends additional support to the theories of physical etiology in psychiatric disorders. The lumbar segments are of little importance in connection with the autonomic nervous system.

SUMMARY

Studies in neurophysiology, neuroanatomy, and clinical psychiatry have pointed toward a concept of psychiatric disorders based on a physiological and mechanistic etiology. This lends support to a similar concept set forth as early as 1914 by osteopathic psychiatrists. The lesion frequencies found by Still's survey (Table I) take on new significance in the light of these recent laboratory findings.

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Endometriosis*

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Endometriosis may be defined as that condition in which tissue resembling endometrium more or less perfectly is found aberrantly in various locations, chiefly the pelvic cavity.[1] A definite clinical entity results which is more commonplace than generally realized. An estimated 10 to 20 per cent of all pelvic laparotomies are today performed for this condition. It is a disease of the upper economic strata of society; it occurs more frequently in those women who have late marriages and few pregnancies. It is an extremely interesting pathological entity—no other benign condition possesses such invasive characteristics.

The term "endometriosis," introduced by Sampson,[2] is today the most widely accepted, supplanting such earlier terms as "endometrioma" suggested by Blair Bell[3] in 1922 and "müllerianoma" by Bailey[4] in 1924. The term "endometriosis" indicates the resemblance to the endometrium but does not definitely characterize the lesion as a tumor or inflammatory lesion or as always arising from uterine mucosa.

This condition has been given a variety of classifications with regard to its pathological type. Even more confusing has been the discussion of its etiology and pathogenesis.

For purpose of clarity, I prefer to consider pelvic endometriosis and the condition of adenomyosis uteri together. The two are pathologically similar, although they may be etiologically dissimilar, and it is not uncommon to find them co-existent. Two main classifications are therefore in order: (1) Endometriosis interna (adenomyosis or direct type), and (2) Endometriosis externa (indirect or peritoneal type). The latter group will also embrace the few cases of transplantation and metastatic lesions that occur.

The aberrant extrauterine endometrium was first described by Russell[5] in 1899, but it was not until 1921 that the classic work of Sampson[1] brought forth the full realization of the importance of peritoneal endometriosis as a gynecological entity.

Von Recklinghausen (1896) was one of the first to direct attention to the glandular tumors located in the myometrium, but it was the classic work of Cullen which established the true nature of the lesions.[6]

INTERNAL ENDOMETRIOSIS

Histogenesis.—The histogenesis of the internal type is rather well understood, if the underlying etiology is not. The early work of Cullen and others has definitely established the origin of the glandular elements from the uterine mucosa. Because of some abnormal stimulation, the basal layers of endometrium along with the endometrial stoma, invade the underlying muscle. Some aberrant islands retain direct continuity with the surface, others become completely segregated. These islands of basal and stromal cells grow in the myometrium and differentiate themselves into glandular structures. At the same time there is proliferation of surrounding muscle fibers. These buried islands may assume the full cyclical functions and decidual reactions of the parent endometrium, or may be of an immature variety. There is no conclusive proof of what actually initiates this process, but an endocrine dysfunction of the ovary may play a part.

Gross Characteristics.—The glandular formations may be fairly discrete and produce no gross changes in the uterus. Again, they may be diffuse and cause a symmetrical enlargement of the uterus due to thickening of its walls. In many cases there is associated external endometriosis with the resultant adherence of uterus to adnexa and rectum, producing the "frozen pelvis." Indeed, it may be that the glandular elements actually penetrate the uterine serosa to produce the picture of general pelvic endometriosis.

Important Clinical Considerations.—The age of patients with internal endometriosis is generally greater

*Presented at the Twenty-Second Annual Clinical Assembly of the American College of Osteopathic Surgeons, Detroit, October 11, 1949.

ENDOMETRIOSIS AND ADENOMYOSIS

(Extra-Uterine and Intra-Uterine Endometriosis)

Test period covers two-year period from August 1947, through July 31, 1949, at the Detroit Osteopathic Hospital.

Total number of major gynecological surgical cases during test period 1485

Total number of proved cases of endometriosis and/or adenomyosis during test period 204

Percent of major gynecological surgical cases disclosing endometriosis and/or adenomyosis 13%

TABLE I. Total number of gynecological surgical cases at the Detroit Osteopathic Hospital and total number and percentage of cases of endometriosis and/or adenomyosis during the 2-year period from August, 1947, through July 31, 1949. Tables II, III, IV, V, and VI are based on various phases of this same series of cases.

than that of patients with the external type. The condition is most common in the third, fourth, and fifth decades. Women with the internal type show a relatively high incidence of pregnancy in contrast to the high incidence of sterility in the external type. The predominant symptoms of adenomyosis uteri are:

1. Menorrhagia (often associated with interval bleeding) due to increased endometrial surface and endocrine dysfunction

2. Dysmenorrhea of a colicky type due to the swelling of glandular islands in the nonelastic myometrium. Pain may be referred to the rectal and sacrococcygeal areas when there is rectal and uterosacral extension of disease.

Adenomyosis should be suspected when there is a history of menorrhagia and severe dysmenorrhea acquired about the fourth decade. This history coupled with the finding of a symmetrically enlarged uterus, and perhaps fixation of the pelvic organs and nodularity of the uterosacral ligaments, leads to a presumptive diagnosis or adenomyosis with or without peritoneal endometriosis.

EXTERNAL ENDOMETRIOSIS

Histogenesis.—Unlike that of internal endometriosis, the histogenesis of the external type remains in a state of dispute and misunderstanding. There have been various theories propounded and many modifications of each. Only three theories have received significant attention. Each has been founded to some extent in logic and fact. Each leaves much to the realm of fancy. None satisfies all criteria for universal acceptance.

TYPES OF ENDOMETRIOSIS

Type	Number of Cases	Percentage
Ovarian	100	49%
Parametrial	66	34%
Oviduct	12	6%
Appendix	7	3%
Cervix	1	0.5%
Adenomyosis	73	36%

	Endometriosis, only	Adenomyosis, only	Adenomyosis combined with Endometriosis
Number of cases	131	59	14
Age Range	18-57 Years	28-56 Years	29-51 Years
Average Age	33 Years	45 Years	42 Years

TABLE II

1. Sampson's implantation theory: This theory is that peritoneal endometriosis arises from particles of uterine mucosa which are carried with the menstrual blood in a retrograde manner through the fimbriated tubal ends and deposited on the surfaces of the adjacent pelvic structures where they grow and may give rise to secondary implants. This regurgitation would be favored by any factor hindering outflow of blood through the cervical canal, such as, cervical stenosis, retroflexion of the uterus, uterine fibroids or polyps, or any instrumentation of the uterus. In support of his theory, Sampson offered these points of evidence:[1]

a. The observance of menstrual regurgitation at time of operation.

b. The distribution of implants usually found are in expected locations as if dropped from the tubal ends.

c. Tubal lumina are usually patent in cases of endometriosis.

d. Transplants have been observed to grow in incisions following operations involving uterine or tubal mucosa.

e. In animal experiments, endometrium has been observed to grow when implanted in peritoneum.[7]

MENSTRUAL HISTORY AND COMPLAINTS:

	Endometriosis, only	Adenomyosis, only	Adenomyosis combined with Endometriosis
Irregular Menses	31%	24%	43%
Dysmenorrhea	44%	32%	65%
Menorrhagia	26%	21%	36%
Metrorrhagia	27%	41%	36%
Backache	34%	44%	36%
Leucorrhea	28%	14%	50%
Abdominal Pain	60%	42%	57%
Menopausal	3%	25%	7%

TABLE III

Meyer, Ivanoff, Novak and others have raised the following objections to Sampson's theory:[1]

a. Retrograde menstruation is a rarely observed phenomenon as contrasted with the frequency of endometriosis.

b. It is difficult to believe that particles of endometrium could find their way through the small uterine ostia of the tube, travel outward in retrograde fashion, and still be capable of implantation and growth upon the pelvic peritoneum.

c. The cast-off endometrium of menstruation is nonviable.

d. Jacobson's animal experiments have dealt with normal, viable endometrium.

e. Experiments with artificially created uteroabdominal fistulas have failed to produce implantation, regardless of volume of menstrual spill.

f. Sampson's theory could not explain endometriosis of such remote areas as umbilicus, or the rare lesions found in more distant parts of the body.

It is only fair to Sampson to note that he has not held dogmatically to his original theory but has conceded that in some cases there are etiological factors other than retrograde menstruation.

2. Serosal or Celomic Metaplastic Theory: Iwanoff, in 1898, was the first to propose that endometrium-like tissue might result from a metaplasia of the cells derived from celomic epithelium. The abdominal-pelvic

serosa and the müllerian genital structures are originally derived from the same germinal layer. Robert Meyer has been the foremost champion of this theory. He believed the existing factor to be of inflammatory nature.[8]

Others, including Meigs, Goodall, and Novak, believe the exciting factor to be hormonal.

Meigs[9] has expressed the view that in the process of differentiation of celomic epithelium, all primitive cells capable of producing müllerian tissue may not be utilized. Then, prolonged uninterrupted hormonal secretion stimulates these cells and endometriosis results. He offers this process in explanation of several recognized clinical facts:

a. High percentage of cases showing certain stigmata of underdevelopment.

b. Greatest number of cases occurring in women making late marriages.

c. Greatest number of cases occurring in women who have first pregnancy relatively late in menstrual life.

Another modification of serosal theory is that of Heim, who believes the metaplagia takes place in the lymphatic endothelium.[1]

HISTORY OF PREGNANCY, MISCARRIAGE AND STERILITY:

	Endometriosis, only	Adenomyosis, only	Adenomyosis combined with Endometriosis
Number of Patients that ever were Pregnant	93 (70%)	56 (95%)	10 (71%)
Average number of Pregnancies for those that ever were pregnant	4 Pregnancies	2 Pregnancies	3 Pregnancies
Number of patients that had Miscarriages	24 (20%)	27 (48%)	3 (30%)
Number of patients that were sterile	27 (23%)	2 (2%)	3 (23%)

TABLE IV

3. Metastatic Theories: Endometriosis of regional lymph nodes and even more remote areas have been described by various authors, giving rise to theories of spread via blood stream and lymphatics. Halban was a foremost advocate of lymphatic endometrial emboli. That this may occur at times is conceded by most, but the theory is favored by few to explain the etiology of this disease.[8]

It is quite evident that no single theory yet presented is adequate to explain all cases of external endometriosis. We are forced to conclude that the condition has a multiplicity of origins and methods of spread. There are, no doubt, important factors which are yet to be recognized.

Gross Characteristics.—External endometriosis is characterized by the pressure of "implants" upon peritoneal surfaces, chiefly those of pelvic viscera. These implants develop the typical cyclical reactions of endometrium and are under full trophic control of the ovarian hormones. There may be few implants confined to one location or they may be widely scattered throughout the pelvis. Each implant undergoes the premenstrual swelling and menstrual slough that occurs with each normal cycle. Cystic cavities may be formed within the implants and be filled with dark menstrual blood. This is particularly prominent in the ovary where large "chocolate cysts" are not uncommon. These should not be confused, however, with the hemorrhagic cyst of the corpus luteum. A gross differentiation can easily be made at the operating table. After the cyst is emptied of blood, the cyst wall of the true endometrial cyst will appear velvetlike and deep red in color.

CASTRATION:

	Endometriosis, only	Adenomyosis, only	Adenomyosis combined with Endometriosis
Patients who were Castrated	74 (57%)	45 (78%)	10 (71%)
Average Age	37 Years	45 Years	39 Years
Patients who were not Castrated	57 (43%)	14 (24%)	4 (28%)
	29 Years	42 Years	39 Years

TABLE V

The monthly bleeding occurring from implants leads to formation of adhesions with adjacent structures. In advanced cases, the adhesive formation becomes quite extensive with the resultant "frozen pelvis." Extensive invasion of the rectosigmoidal area has led to partial or complete obstruction by an annular constricting lesion which may be mistaken for carcinoma.

There is a wide gradation of cases as to extent of lesions and progress of disease. It is impossible to predict the future of the young woman with few implants and few symptoms. The disease may remain relatively stationary even without treatment for many years, or within a few years may cause extensive pelvic damage and extreme menstrual symptoms and pelvic pain.

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SURGICAL PROCEDURE:

	Endometriosis, only	Adenomyosis, only	Adenomyosis combined with Endometriosis
Total Hysterectomy	62 (47%)	54 (90%)	11 (79%)
Average Age	38 Years	45 Years	47 Years
Sub-Total Hysterectomy	10 (8%)	2 (4%)	1 (7%)
Average Age	38 Years	39 Years	34 Years
Vaginal Hysterectomy	0	2 (4%)	0
Average Age		54 Years	
Patients who did not have Hysterectomy	59 (29%)	1 (2%)	2 (14%)
Average Age	28 Years	35 Years	35 Years

TABLE VI

Some Common Neurological Disorders of Children*

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THE CONVULSIVE STATE

Infants and children are more susceptible to convulsive seizures than adults. A number of theories have been advanced to explain this predilection, but thus far there is no one fully accepted hypothesis. Holt and McIntosh[1] suggest that the susceptibility to convulsions in infants may be due to "the fact that the chemical and immunological defense mechanisms are not well developed, and that, as a consequence, noxious agents capable of stimulating the central nervous system are better able to reach it."

Etiology.—The etiology of convulsions is frequently broken down into functional and organic components on the basis of demonstrable cortex pathology, and if no cause can be assigned to a case it is termed idiopathic or true epilepsy.

Among the organic causes of convulsions may be mentioned meningitis, brain tumor and abscess, cerebral hemorrhage, hydrocephalus, encephalitis, and syphilis of the brain.

Functional causes may include acute infections, diseases, and infections of the respiratory, urinary, and digestive tracts. Overfeeding, dentition and worms have been blamed, but undoubtedly the role they play is of little consequence.

Toxic convulsions due to uremia and various poisons and drugs are also met with.

Hypoglycemia which occurs in the fasting state in some children tends to produce convulsions in much the same way as an overdose of insulin. The cause is not clear and probably varies, although in some cases the liver is apparently unable to store glycogen.

Tetany accounts for many of the convulsions during the latter part of the first year and the second year.[2] Tetany is invariably associated with a low serum calcium and responds readily to calcium therapy. Tetany is differentiated from the epilepsies in that consciousness is not usually lost during an attack.

The cause of idiopathic or essential epilepsy is unknown. However, a number of theories have been suggested which accentuates the fact that the true etiology is as yet shrouded in mystery. The multiplicity of suggested causative factors is supportive evidence of the present-day concept which regards epilepsy as a symptom complex rather than as a disease.

Heredity appears to operate in some cases although various writers feel that this possibility has been overemphasized. Holt and McIntosh[3] say that if congenital cerebral defects are excepted a family history of the disease is obtainable in only 10 per cent of cases. Along the same line Wechsler[4] states that direct heredity probably plays a definite role in a small percentage of cases. However, even if other ascendants and collaterals are included, it is probably less than 25 per cent.

Chronic alcoholism in the parents is a much debated etiologic factor; however, it is difficult to assign it a very definite role. Unfavorable intrauterine environment is sometimes thought to be important; however, this is also difficult to prove. Various physical defects, which are referred to as the stigmata of degeneration, are not uncommonly found among epileptics. This has led some workers to believe that the correlation is not coincidental, but that the physical defects are directly associated with the epilepsy. Mental defectiveness is sometimes associated with epilepsy, the theory being that the same disturbance is responsible for both conditions. This theory does not refer to the mental defectiveness which is the result of long continued epilepsy. Endocrine disturbances are thought by some to play an important role in the production of epilepsy; the pituitary and the thyroid are most frequently blamed. However, this hypothesis is not given much credence by the majority of investigators.

Sensitization to food and various other agents has been thought to be the basis, at least in some cases, of epilepsy. Recently the use of some of the bleaching agents which are utilized in the production of white bread have been given considerable notice. Laboratory animals, when put on a diet that included flour bleached by such an agent, developed convulsive seizures. Again, however, it is well to emphasize the true nature of epilepsy remains unknown.

Peterman[5] gives the following percentages in analyzing the etiology of convulsions in 2500 children.

Acute infection	33.4
Idiopathic epilepsy	26.3
Cerebral birth injury or residue	14.2
Miscellaneous causes	13.1
Infantile tetany	7.4
Cause not established	5.6

Pathology. — Hemorrhages, both punctate and more extensive, as well as edema are frequently found in the brains of infants who die during convulsive seizures. Pulmonary congestion and dilatation of the right heart are quite regularly found in children dying of convulsions.[6] In true epilepsy thickening of the pia arachnoid and cortical atrophy have been described as well as distortion and dilatation of the ventricles. On the other hand many individuals suffer from severe convulsive seizures for years without developing any apparent pathological changes.

Symptoms.—Occasional prodromal symptoms precede a convulsive seizure such as restlessness and irritability, but often the onset is abrupt. The eyes become fixed and frequently roll up in the orbit. Respirations cease, consciousness is lost, and convulsive twitchings begin, usually in the face or eye, and rapidly spread out to involve all the body. In some cases they remain unilateral. The child usually goes into a position of marked extension and a series of spasmodic contractions follow. Cyanosis may develop toward the end of the seizure and at times the lips are quite purple. Frequently there is considerable salivation. The pulse may be either rapid or slow; sometimes it is irregular. The bladder and rectum may be emptied. The convulsive movements become weaker as the attack progresses and after a variable period, usually a few

*Presented at the Neuropsychiatric Teaching Sessions, Fifty-Third Annual Convention of the American Osteopathic Association, St. Louis, July 13, 1949.

minutes, they cease. After the convulsive movements cease the individual is usually in a stupor from which he can be awakened after several minutes, but with difficulty.

Diagnosis.—Convulsions in the newborn are frequently the result of cerebral defects and birth injuries. From 1 or 2 months to 2 years of age tetany should always be suspected. Blood calcium determinations are of great value. Convulsions associated with a high fever are often due to a respiratory or urinary infection. Also meningitis and encephalitis must be considered. Epilepsy may be considered as a cause when the child is 2 or more years old. Brain tumors should be considered as the child grows older, especially in the absence of fever. Focal signs are of value in diagnosing tumors. A lumbar puncture is indicated whenever syphilis is suspected. Blood sugar and urea determinations often yield important diagnostic material. A low blood sugar must be found consistently before seizures can be considered indicative of hypoglycemic etiology. A spinal tap is of value in encephalitis and meningitis. The history is important. Idiopathic epilepsy is the cause of recurring convulsions which occur without fever or any other sign of somatic disease.

Prognosis.—The prognosis in convulsive seizures depends upon the underlying causative factor. If the convulsions are the result of idiopathic epilepsy the outlook for a normal life span is fairly good, but according to Wechsler[7] "less than 10 per cent of the patients are cured by treatment or have spontaneous recession of the convulsions." It is generally estimated that 50 per cent of the individuals who suffer from severe convulsions over a long period have some degree of mental deterioration. Holt and McIntosh[8] state that "convulsions occurring during the neonatal period do not necessarily mean a bad prognosis." If convulsions are produced by the type of a brain lesion that is accessible to neurosurgery the outlook is, of course, more favorable than in cases in which the pathology is more difficult to deal with.

A number of investigators feel that the individual who has convulsions as the result of an acute infection during childhood is more likely to develop idiopathic epilepsy than the individual who has never been subject to seizures. Convulsions may appear as a terminal disturbance in certain acute infections and under such circumstances their presence is indicative of a grave prognosis. Pertussis is usually considered in this group. Prognosis is poor in any respiratory condition that tends to produce asphyxia which is associated with convulsions. The outlook is grave in prolonged convulsions and convulsions which recur frequently. Naturally the prognosis is unfavorable if the patient is prostrated, cyanotic, or has a bad pulse.

Treatment.—The immediate treatment of convulsions may be summed up as follows: If a seizure is in progress whatever is possible to keep the patient from getting hurt should be done. A handkerchief folded several times and inserted into the patient's mouth may prevent serious injury to the tongue. In seizures which are associated with a high fever it may be of value to use an antipyretic. If the seizures are severe and coming close together sodium phenobarbital by injection is frequently of value. If this fails, and if there is no evidence of respiratory involvement, chloroform may be used. In the refractory cases Avertin by rectum, 5 to 75 mg. per pound of body weight, will often prove effective. Magnesium sulfate, 2-8 cc. intramuscularly every 4 hours or 2 to 5 cc. of a 25 per cent solution intravenously, may be of help.

Tetany responds favorably to calcium chloride in a 10 per cent solution by mouth, 1 to 4 grams initially and 1 gram every 6 hours until the calcium serum level reaches 8 mg. per cent. If necessary 5 to 10 cc. of a 10 per cent solution of calcium gluconate may be given intravenously every 6 hours. It is wise to follow up with hydrochloric acid and vitamin D for several weeks. Uremic convulsions are considered to be caused by edema of the brain and therefore a spinal puncture and drainage are helpful. Magnesium sulfate, glucose, and sucrose are also used.

Treatment Between Attacks.—The ketogenic diet which has a high fat content is often of value. This type of diet is preceded by a near starvation diet for a week or 10 days. Peterman[9] states that the ketogenic diet will control the convulsions in one third of the cases and will help another third. Phenobarbital remains one of the most effective drug treatments. It has the advantage of being inexpensive and its side reactions are usually not severe. For children under 5 years of age ¼ to ½ grain every 6 hours is recommended and for those 5 to 10 years old, ½ to 1 grain every 6 hours. It is usually given 4 to 6 hours before the convulsion is expected or if the seizures are unpredictable it may be given 3 times a day. Phenobarbital therapy is continued for 1 year, and then during the second year it is gradually withdrawn. Thiantoin is a new anticonvulsant which has been found to be effective in both grand mal and petit mal seizures. The dose is 0.13 to 0.26 gram every 4 to 6 hours. Mesantoin, another recent anticonvulsant, is effective in grand mal seizures. The dose is 0.2 to 0.6 gram daily. Tridione has been found to be of value in petit mal seizures. The dose is 0.3 to 0.6 gram every 6 hours. The blood count must be regularly checked when this drug is used. Dilantin has not been too effective in pediatric practice.

THE INFECTIOUS STATE

Encephalitis Associated with Acute Infectious Diseases (acute hemorrhagic encephalitis of Strumpell).—Encephalitis can complicate virtually any of the acute infectious diseases. However, in certain of the exanthemata, notably measles, rubella, variola, and varicella, the course of the infection is rather characteristic. Some authorities feel that such an encephalitis can be primary in children, although it is often associated with an acute infectious disease. The etiology is not too well understood and a number of theories have been advanced. Some believe that by some unknown process the virus responsible for the original infectious state gains access to the nervous system: others believe that a neurotropic virus is responsible, and some believe that allergy is an important factor.

The pathological state is characterized by inflammatory and hemorrhagic foci scattered through the midbrain, pons, cerebrum, region of the aqueduct, and the medulla.

Young children are the most frequently affected. The onset is usually acute, and it may be of a fulminating nature which is characterized by headache, fever, and mental dullness. Soon a stuporous condition develops and then unconsciousness. The pulse is rapid and the respirations irregular. There may be moderate neck rigidity as well as convulsions and delirium.

If the disease progresses rapidly it frequently ends in death. However, it may become chronic or recovery from the acute phase may take place, but paralytic signs usually develop. Among the sequelae are hemiplegias, monoplegias, ocular and other cranial palsies, hemianopsia, cerebellar ataxia, nystagmus, and mental deficiency.

The prognosis is grave in the acute cases since death so frequently ensues and those that recover frequently have some permanent defect.

Postvaccinal Encephalitis.—Occasionally encephalitis follows vaccination for smallpox. It usually develops from 10 days to 2 weeks following the vaccination. This condition tends to run a very stormy course in which the patient either dies or recovers in 1 to 2 weeks. Usually the recovery is complete, although occasionally one of the permanent sequelae may follow. The mortality rate has been estimated at 50 per cent.

Pertussis Encephalitis.—Occasionally encephalitis develops during the course of pertussis. The clinical course is somewhat different from that of the typical encephalitis following acute infectious disease. The condition is frequently ushered in by convulsions and sometimes will clear up leaving no sequelae. In other cases a number of defects may follow, including loss of vision, paralysis, and mental impairment. Sometimes cerebral atrophy develops which is characterized by convulsions and a comatose condition which may persist for weeks or months. The patient may live for a considerable time.

Recently cases of encephalopathy have been reported following pertussis immunizations. Convulsions occurred in most of the cases and in some there was irreversible damage. Toomey[10] advises that no child receive injections of pertussis vaccine in large amounts (40 billion organisms) who has had (1) any family history of convulsions, (2) a present history of convulsions, or (3) illness of any kind, especially if it pertains in any way to the central nervous system.

Epidemic Encephalitis (lethargic encephalitis, encephalitis of von Economo).—Attention was first focussed on this condition by von Economo[11] in 1917. Since that time epidemics have occurred practically throughout the world. Most of the cases develop in the winter months; however, sporadic cases occur during the entire year. The nature of the disease has varied in each of the epidemics, which has led some observers to theorize that the virus which is responsible for the condition has undergone certain mutations or that a different virus has been the etiological factor in the different epidemics. The sequelae also have varied with the epidemics.

Pathological changes are most apparent in the basal ganglia, midbrain, tegmentum of the pons, and the medulla. The meninges are usually involved to some extent. There is characteristically perivascular infiltration with lymphocytes. Sometimes hemorrhage is present.

In the first epidemic the onset tended to be abrupt with fever. Among the common symptoms were lethargy, diplopia, cranial palsies, neck rigidity, and increased abdominal reflexes. If there was bulbar involvement, irregular pulse and respiration with paralysis of swallowing could be expected. A progressively higher temperature and death frequently followed. Sometimes the patient would develop a catatonic type of stupor from which he could be aroused, but to which he quickly returned. Retention of urine was not rare. Some patients developed parkinsonism.

More recently mental symptoms and abnormal movements have been prominent in the course of the disease. Pupillary and ocular disturbances have been common. The disease has had a tendency to begin as neuralgia which soon develops into jerky myoclonic movements. Delirium and hallucinations are common, as are sleep disturbances. The deep reflexes are active while the abdominal reflexes are absent. Rarely the disease has assumed an apoplectiform course. The fever has been mild except in the very severe forms. The spinal fluid usually shows from 10 to 50 lymphocytes, and an increase in globulin, sugar, and pressure.

The clinical course of the disease may be acute, subacute, or chronic. In recent years the initial phase has been milder. The mortality rate is given from 20 to 40 per cent but a large majority of those who survive have residual defects, often of an incapacitating nature.

A multiplicity of sequelae may follow the acute phase of this condition. Among the most frequent are: Paralysis agitans, facial twitchings, choreas, dystonias, athetoses, pupillary abnormalities (irregular, miotic, unequal, or dilated), nystagmus, ocular spasms, with conjugate deviation of the eyes, compulsive movements, diabetes insipidus, various respiratory disturbances, yawning, hiccough, narcolepsy, cataplexy, forgetfulness, inability to concentrate, various psychotic manifestations, tantrums, destructiveness, behavior problems and sexual disturbances.

The diagnosis is easy if the case is typical. An acute condition with widely disseminated central nervous pathology is suggestive. Also the progressive nature of the disease is helpful.

Treatment is largely symptomatic. Convalescent serum has not proved very satisfactory. Sedatives may be used to control the irritability and insomnia. Hyoscine is of help in controlling the rigidity of parkinsonism. Ephedrine and benzedrine are used for narcolepsy. Anything that can be done to improve the general health is of value.

Cerebral and Cerebellar Abscess.—Abscesses are seen more frequently in children than in adults. It usually follows infection in some other part of the body; however, in cases of trauma it may develop without any apparent pre-existing infection. The infection may be blood borne but more frequently it follows a course of direct extension. An abscess may be located anywhere in the brain, but areas of predilection are the frontal, temporal, and occipital regions. Probably otitis is responsible for more brain abscesses than any other single condition. Chronic sinusitis is also frequently the offender and occasionally acute sinusitis is the causative factor. Direct extension from mastoiditis or petrositis may produce an abscess of the temporal lobe or cerebellum. Infections of the frontal and ethmoidal sinuses may extend into the frontal lobe.

Pathology: Abscess of the cerebellum is not so commonly observed as abscess of the cerebrum. Brain abscesses may be of any size and may be single or multiple. In some instances most of the brain substance may be replaced by multiple abscesses. Usually an invasion by direct extension produces a solitary

abscess while most cases of multiple abscesses are the result of metastatic processes. After the abscess has been present for a variable period it becomes surrounded by a rather thick capsule. Abscess usually results when a virulent strain of micro-organisms gains access to the brain, while a mild strain may produce simple encephalitis, with no subsequent abscess formation.

Symptoms: The course of the condition is dependent upon a number of modifying factors—the virulence of the invading pathogens, the size and location of the abscess, and whether multiple or single abscesses are present.

There may be no symptoms at all until late in the course of the disease, or there may be an acute onset with a fulminating pattern. The symptoms may be local due to size and location, or they may be general due to the infectious process, or both types of symptoms may be present.

In the more acute forms there is a sudden onset with high fever, severe headache, nausea, vomiting, drowsiness, delirium, and stupor. These manifestations may progress to a comatose condition and death may occur in 3 or 4 weeks.

The clinical course may run a different form in which there is an acute onset after which the symptoms gradually subside and a period of latency sets in. However, sooner or later, the abscess has to be reckoned with or death will ensue.

Again, there may be no acute phase and gradually progressive symptoms of increased intracranial pressure call attention to the pathological process. In this form there may be a slight rise in temperature at the same time every day and a low grade leukocytosis.

Terminally, if the process is allowed to continue uinterrupted, there is severe headache, vomiting, fever, stupor, and coma. Paralysis, convulsions, and meningitis often occur at this stage.

Diagnosis: Fever, headaches, delirium, and stupor are characteristic. Frequently there will be leukocytosis. The history of otitis or a sinus infection may be helpful. There may be localized pain and tenderness over the scalp and there will be evidence of an intracranial disturbance and sometimes there will be localizing symptoms. A period of latency after an acute onset followed by manifest symptoms also is suggestive of a brain abscess.

Prognosis: This must always be guarded. However, since the advent of the antibiotics the outlook is much more hopeful. A superficial abscess is more likely to be accessible to treatment than a deep one. Metastatic abscesses are particularly difficult to cope with. Otitic abscesses often end fatally. The outlook is bad in a cerebellar abscess and fair in a temporal abscess.

Treatment:[11] Preventive—Many of the conditions which used to give rise to brain abscesses are now prevented by the use of antibiotic drugs. Preoperative—When the diagnosis of abscess is made, the patient should be put on penicillin therapy consisting of intramuscular injections of 50,000 units every 3 hours around the clock. This treatment is continued, the patient's condition permitting, for at least 3 days before operation. Operative—An osteoplastic craniotomy is made over the abscess. The pus is evacuated through a hollow needle. Suction and coagulation current are combined to excise the abscess in one mass. Penicillin is used locally in the cavity left by the evacuation of the abscess. Streptomycin may be indicated in cases where there is evidence of the presence of gram-negative bacteria. Antibiotic dosage may be altered according to age.

Meningococcic Meningitis (epidemic meningitis, cerebrospinal fever, spotted fever).—The specific organism responsible for this condition was first described by Weichselbaum in 1887. The clinical forms of epidemic meningitis were recognized in both America and Europe during the early part of the nineteenth century. The causative organism is the Neisseria intracellularis or the meningococcus, of which there are several strains. Characteristically the organism occurs intracellularly although it is sometimes seen extracellularly. This disease occurs in epidemic form in virtually all cities and is present in endemic form in the relatively long intervals between the epidemics. The epidemics usually occur in the winter and early spring period gradually tapering off in the warmer months. The disease is not highly contagious and often there is only one case in a household.

Early in the disease pathological changes may be virtually absent and are often limited to a slight amount of serous exudate and some hyperemia. Generally there is an increase in the amount of the cerebrospinal fluid as well as an increase in the number of leukocytes. First the cells present in increased numbers tend to be lymphocytes, but as the disease progresses there is a marked increase in the polymorphonuclear leukocytes. As the disease continues its course, cerebral convolutions may be flattened from pressure and a greenish-yellow exudate is found on the surface of the brain. The ventricles become filled with exudate and are frequently dilated as a result. If the infectious process becomes chronic, a chronic meningoencephalitis results. The pia is cloudy and thickened and the dura may be adherent to the brain. Fatty degeneration and proliferation of connective tissue occur. A secondary hydrocephalus may occur in this stage. If the infection continues for an extended period some very marked changes may occur, such as cortical atrophy and metastatic complications involving the joints and eyes.

The clinical picture often is one of a sudden onset particularly during epidemics. However, there may be some premonitory symptoms such as restlessness, apathy, and mild headache. Nasopharyngitis may be present and it is probable that the meningococci gain entrance to the nervous system via the blood stream from the nasopharynx. As the disease progresses the milder symptoms give way to a severe headache, fever, chills, vomiting, and vertigo. Frequently sensitiveness to light and sound develops as well as marked restlessness and insomnia. Neck rigidity is present and becomes progressively more marked, often developing into retraction. Brudzinski's sign occurs in a very high percentage of the cases and Kernig's sign is frequently present. There may be cutaneous disturbances such as erythematous eruptions, purpuric rashes, and herpes.

The deep reflexes are increased at first while the abdominal reflexes gradually disappear. There is usually a leukocytosis of 25,000 to 40,000. Gastrointestinal symptoms may be prominent with abdominal pain and constipation. Retention of urine is not unusual. As the disease progresses headache becomes more marked and opisthotonos often develops. The sensorium becomes clouded, the pupils dilated and rigid, and ocular palsies, strabismus, and facial paresis develop. In-

volvement of the eighth nerve may produce deafness. Conjunctivitis, keratitis, and cerebral monoplegias and hemiplegias are not uncommon. In the later stages a comatose condition is present. In cases which terminate fatally the coma deepens, a total incontinence appears, emaciation is marked, the fever climbs, and the pulse becomes inadequate.

In infants and young children the clinical picture may be that of septicemia with meningeal symptoms at a minimum. This may be accounted for by the fact that sometimes the meningococcus can be demonstrated in the blood while the spinal fluid remains negative. These cases often tend to run a very acute course. In some infants convulsions and bulging of the fontanels may be present while neck rigidity is absent.

The disease may run a chronic course lasting many months or, especially at the beginning of epidemics, the clinical course may be fulminating, resulting in death in a day or 2, or even in a matter of hours. Mild cases are particularly apt to occur at the end of epidemics. In favorable cases the signs usually recede in the first week or 10 days. Relapse may occur and the disease continue for a prolonged period producing chronic hydrocephalus. Before chemotherapy was available the mortality rate was from 50 per cent up. Of course, the outlook is now much more favorable. Often recovery is complete, but there may be sequelae which, if they do not clear up within a few months, probably will be permanent.

Diagnosis: The spinal fluid findings are very important in doubtful cases. There is usually an increase in pressure and in leukocytes with polymorphonuclears dominating. The count ranges from a few hundred to a thousand. The protein content is increased and the sugar content is reduced. The organism can usually be identified by culture or smear or both.

Treatment: Sulfadiazine and penicillin are both very effective. Sometimes they are used in combination. Penicillin may be used in a 100,000 unit initial dose followed by 50,000 units every 3 hours until there is improvement. Then the dosage may be reduced to 20,000 or 25,000 units until all signs of infection have cleared up. Sulfadiazine therapy is usually initiated with a 4 gram dose and followed by 1 gram every 4 hours. Drug dosage must be altered according to age. The usual precautions necessary in administering any sulfonamide should be observed. Symptomatic therapy is aimed at maintaining an adequate rate of nutrition and water and electrolyte balance. Analgesics may be used to control the cephalalgia.

Other Types of Meningitis. — Chronic basilar meningitis is simply a chronic form of meningococcus meningitis, often seen following epidemics. It is characterized by a gradual onset. Acute benign lymphocytic meningitis is a mild type of meningitis caused by a filterable virus. The onset is abrupt and the disease usually runs its course in a week.

Pneumococcic Meningitis: This disease usually occurs in young infants and develops during an attack of pneumonia. An untreated case runs a rapidly fatal course, death usually occurring in 3 or 4 days.

Streptococcic Meningitis: This disease may occur in the newborn, the result of umbilical infection, or it may follow infection of a meningocele. It may follow head injuries, erysipelas, or otitis. The course is rapidly fatal without treatment.

Tuberculous Meningitis: This form is secondary to tuberculosis elsewhere in the body. It is frequently secondary to tuberculous encephalitis. It is more frequent in the years of early childhood. The symptoms usually develop gradually and it may be 1 or 2 weeks, or longer, before meningeal symptoms become apparent. The course is usually a progressive one and before streptomycin was virtually hopeless. However, some favorable reports have followed the use of the drug, especially when an early diagnosis has been made.

Still-Hildreth Osteopathic Sanatorium

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PROBLEMS IN THE NATURAL HISTORY OF POLIOMYELITIS

The people who have worked for many years gathering information on the natural history of poliomyelitis are more impressed with the tremendous amount that remains to be learned than with what is known at the present time. That is not to say that in the approximately 40 years since the discovery of the virus etiology of the disease, there has not been accumulated a great deal of basic information, but what we know is still so sketchy that different investigators can interpret the available data in different ways. . . .

It is no longer mere epidemiologic hypothesis to regard paralytic poliomyelitis as only one part of the clinical spectrum which results from infection with poliomyelitis virus. Although there are as yet no simple tests for poliomyelitis infection in the individual case, the data very laboriously collected thus far suggest that following introduction and multiplication of the virus in the human body the following events may ensue: (1) no obvious signs of disease, (2) a febrile illness of one to seven days' duration associated with any one or all of the following symptoms—headache, mild sore throat, nausea, vomiting, abdominal pain, (3) the preceding syndrome plus distinct nuchal or spinal rigidity, and (4) the preceding syndrome with varying degrees of paralysis and other signs indicative of involvement of the central nervous system.—Albert B. Sabin, M.D., *Annals of Internal Medicine*, January, 1949.

The Osteopathic Management of Neurological Diseases in Children*†

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INTRODUCTION

The diseases of the nervous system of childhood constitute a difficult field of practice which belongs to both the neurologist and the pediatrician. In many cases the services of both specialists are necessary to obtain a correct diagnosis and to institute an adequate program of management. It is not uncommon to find a neurological involvement following the acute infectious diseases of children, and conversely the neurologist may require the services of a pediatrician in dealing with a disease process which complicates a neurological problem.

The nervous system of the child, compared with that of the adult, is in a developmental state. For this reason many symptoms that in the adult would be clear-cut and definite are, in the child, obscure. This renders accurate diagnosis more difficult and in some cases uncertain. Therefore, the management of a neurological process is placed on a symptomatic rather than on an etiological basis in spite of the fact that this is to be avoided if possible. In many conditions, as in congenital malformations, it is impossible to correct the etiological factors and the management must be symptomatic.

The customary anatomical classification of neurological syndromes has proved to be inadequate when applied to their diagnosis and management in children. Therefore, a classification based upon etiological factors and certain localizing symptoms is useful to indicate which portion of the central nervous system no longer functions normally. Such a classification, based on disturbances of function, is as follows: (1) lower motor neuron syndromes, (2) upper motor neuron syndromes (the pyramidal syndromes), (3) syndromes involving the extrapyramidal tracts, (4) cerebellar syndromes, (5) syndromes involving the neuromuscular system, (6) congenital and developmental abnormalities, and (7) autonomic syndromes. This classification tends to be dogmatic and in some cases inadequate because many neurological entities found in children cannot be classified in any one category. However, there usually will be symptoms that permit a more or less accurate classification which is useful from the clinical standpoint.

Beside the difficulty in placing the symptom complex in a single classification the physician must consider the influence of other disease processes that occur in children. The acute infections, the deficiency conditions, and the mental states influence the course of neurological pathology and will modify the management because it is possible that neurological involvements may be the direct result of an apparently unrelated systemic process.

The proper management of a neurological syndrome in childhood depends primarily on accurate diagnosis. Following the establishment of diagnosis the osteopathic physician should institute a rationale of treatment designed to eliminate the etiological factors, if known, and at the same time eliminate or control disturbing symptoms.

It is realized that it is not always possible to follow such a course and in many cases symptomatic treatment is necessary first, but it should be regarded as a temporary expedient until such time as the basic factors of the disease may be considered.

It is widely assumed that organic diseases of the nervous system are more generally incapable of amelioration and cure than those of other systems. This is true because a longer period of survival is common with diseases of the nervous system than with visceral or infectious diseases, and the grave disability of the victim lends an air of hopelessness to the therapeutic problems involved.

The osteopathic treatment of clinical neurological processes in children is confined chiefly to the following procedures: (1) osteopathic manipulation, including soft tissue, cranial, and spinal technics; (2) physical therapy, including massage, hot and cold packing, and electrotherapy; (3) the metabolics, including methionine and glutamic acid; (4) substitution or dietary therapy, including the vitamins, and (5) chemotherapy, including the sulfa drugs and penicillin. There are contraindications for each modality in various neurological conditions with the exception of osteopathic manipulation. Furthermore, no class of people responds more quickly to osteopathic therapy than children, and even if other modalities are indicated, manipulation acts in a synergistic manner to produce better results. Hopeless cases are sometimes benefited by cranial and spinal manipulation alone.

It is the purpose of this paper to discuss the osteopathic management of neurological diseases in children and this will be done on the basis of the classification given above.

MANAGEMENT OF NEUROLOGICAL CONDITIONS IN CHILDREN

1. *Lower Motor Neuron Syndromes.* — Lower motor neuron syndromes occur in children usually as the result of either trauma or acute infectious processes. The extent of neurological damage may be slight or so severe as to completely incapacitate the child. In either case the management is essentially the same and the treatment directed toward accomplishing the same result, that is, maintaining the function of the anterior horn cell of the spinal cord or its homologues in the brain stem.

Lower motor neuron lesions, because of disturbance of the final common path, produce similar symptoms regardless of the etiology. The management of such cases is concerned, therefore, not only with the elimination of the etiological factors but also with maintaining the functional activity of the motor cells. Symptoms of the lower motor lesion briefly are loss of voluntary motor activity, marked focal atrophy, decreased tonus, and the elimination of tendon reflexes.

The management of traumatic injuries involving the lower motor neuron is somewhat symptomatic, and at the same time the attempt should be made to aid

*Presented at the Neuropsychiatric Teaching Sessions, Fifty-Third Annual Convention of the American Osteopathic Association, St. Louis, July 14, 1949.

†Clinical observations on which this report is based were made at the Clinic of the Kirksville College of Osteopathy and Surgery.

in the restoration of function. In many instances traumatic injuries to the back produce spinal shock which results in the symptom picture of a lower motor neuron lesion. Such injuries are usually self-limiting if the child is confined to bed for several days. In such cases the following treatment has proved to be effective. The child is put to bed and alternating hot and cold packs are started immediately. They are applied to the area in which the trauma occurred; however, they should not be confined to the traumatized area but applied to the whole spinal region.

Osteopathic manipulation is begun as soon as possible. In cases of traumatic injury, it is advisable to obtain a radiographic evaluation before any treatment is instituted. While the region is tender and sore from the trauma, use of soft tissue technics with a minimum of correction is indicated. Later, therapy should include corrective technics as indicated by the extent of damage sustained. Osteopathic manipulative treatment should be continued until the paravertebral rigidity has been eliminated. The attempt should be made to be as specific as possible and the treatment should be short but thorough.

When acute infectious diseases affect the lower motor neuron, for example, anterior poliomyelitis, osteopathic manipulative treatment should be instituted as soon as the diagnosis is established. In the acute stage para-aminobenzoic acid is administered as an adjunct as it has proved to be effective in virus infections.[1] It is administered in tablets—one every 2 hours. The medication is discontinued when a reduction in temperature to 99 F. has occurred.

Physiotherapy is administered as soon as possible. In the acute stage hot packs are alternated with cold packs in an attempt to maintain an adequate blood supply to the spinal area.

Sinusoidal stimulation is not recommended until the chronic stage of the disease has been reached. It seems advisable, however, to institute treatment as soon as the sore muscle groups permit. Stimulation should be limited at first not exceeding 1 minute the first day but increased over 2 or 3 weeks until it is being applied twice each day in 15- to 30-minute periods. In some instances the child may be apprehensive and, if this be true, no stimulation is administered when the electrodes are applied for the first time. Stimulation is continued until the maximum amount of recovery has taken place, usually a matter of weeks or months.

After discontinuing the para-aminobenzoic acid the metabolics, glutamic acid and methionine, are given orally. Methionine (an amino acid) is given in three 0.5 gram doses daily for 7 days and then discontinued. The intent in giving this metabolic is to assist the liver in its detoxification processes. Glutamic acid (0.5 gram 3 times daily) is given in fruit juices for 2 weeks. The object in using this substance is to increase the metabolic process in the central nervous system. Vitamins are also given and varied according to the needs of the child.

Osteopathic manipulative treatment should be instituted as soon as the child is seen, even though the disease is in the acute stage. It is directed toward reduction of the rigidity of the paravertebral muscle mass. In the acute stage the treatment is necessarily short as these muscles are very tender and sore. The child should be treated frequently and as specifically as possible. It is meant by this that attention should be directed toward relieving the spasm of the muscles affected. Treatment at first should not exceed 30 to 60 seconds, but should be administered every 2 to 3 hours. When the acute stage is passed, the duration of the treatments may be increased and the frequency decreased.

In the acute and, to some extent, in the chronic stages of the disease attention must be directed toward the sphincters and retention or incontinence must be eliminated. Enemas and catheterization may be necessary; however, normalization of the lumbar spine and sacro-iliac regions have a tendency to correct these difficulties, at least temporarily.

At any time specific corrections may be attempted in those areas in which there is a reduction in motion, provided the force is slowly and gently applied and slowly released during the acute stage. It has been suggested that it is not necessary to reduce the paravertebral rigidity in the child before correction is attempted.[2] However, such a procedure as the application of soft tissue technic eliminates a certain degree of muscle soreness and at the same time apparently relieves the nervous irritability and apprehension of the patient. The fact that paravertebral muscle rigidity and osteopathic spinal lesions can produce such nervousness has been proved experimentally.[3]

If the condition is chronic when first seen, it is not necessary to proceed as cautiously as in the acute type, and osteopathic manipulative treatment twice daily is instituted at once. The aim is to reduce the paravertebral muscular rigidity and to eliminate areas of limited motion in the spinal region, with particular attention to the areas of cervical enlargement of the cord if the arms are involved and of lumbar enlargement of the cord if the legs are paralyzed.

The object therapeutically should be thoroughness rather than length in treatment. The osteopathic physician must be alert to tissue changes and stop therapy as soon as the proper response has occurred. It should be emphasized that the involved muscles tire easily and under no conditions should they be traumatized by ill-advised manipulation. The intent of these therapeutic devices is to normalize the blood supply to the infected and irritated areas.

It has been shown, experimentally, that the blood supply to the spinal cord is disturbed in the presence of an osteopathic vertebral lesion.[4] Petechial hemorrhages between the white and gray columns have been reported and in some cases there has been a variation in the staining characteristics of the motor cells of the spinal cord. Such alterations would be classified as the chronic disease of Nissl.[5] Therefore, the management of the case is directed toward a normalization of the functional elements of the spinal cord and this is accomplished by a normalization of the blood supply by restoration of normal function in the vertebrae and paravertebral tissues. The activity of the virus is inhibited by the use of the para-aminobenzoic acid. The removal of the waste products and re-establishment of metabolic levels of the cells of the central nervous system are accomplished by the use of glutamic acid and methionine. Aiding these processes by normalizing the blood supply is accomplished by the use of osteopathic manipulation.

The final stages of management of these cases is the re-education of muscle groups in an attempt to produce function in the affected appendages. Such procedures aid appreciably in shortening the recovery

phase and in hastening ambulation. Re-education is also a source of interest for a child usually resents the restrictions placed upon him by his disease.

Case 1. Female, white, aged 8. The chief complaint was inability to use lower limbs. When the patient was admitted to the hospital the referring physician suggested the possibility of anterior poliomyelitis. There were several cases in the district.

Physical examination indicated that there was an elevation in temperature to 101 F. Reflexes (tendon) in the lower extremity were diminished. There were no abnormal reflexes in the lower limbs with a possible exception of the presence of Babinski's sign. The child could use the lower limbs to the extent of slight voluntary motion in bed but could not walk. She was restless and slightly apprehensive when first seen, although her mother remained with her.

History of the Condition: There was no history of recent illness except that the patient had complained of a cold not severe enough to prevent her attendance at school. Six days previous to the onset she had been running down the aisle, had stumbled and jammed the edge of a desk into her back and side at the level of the seventh to twelfth thoracic vertebrae. She had had a sore back since the accident but no other trouble.

Examination: Physical examination and laboratory findings were negative; spinal fluid examination was not done. Neurological findings were as described above. Considerable paravertebral rigidity and limitations of vertebral motion between seventh thoracic and first lumbar vertebrae were present.

Diagnosis: The diagnosis made was spinal shock due to trauma producing a lower motor neuron syndrome.

Course and Management: Treatment was instituted several hours after admission to the hospital, following the establishment of the diagnosis. Enemas, two daily, and liquid diet were given until the fever was eliminated. Osteopathic manipulation was instituted and directed toward the rigid paravertebral muscles and attempts were made to eliminate the limitation of motion. Alternating hot and cold packs were used every hour when the child was awake for 3 days. At the end of 2 days slight improvement in the voluntary activity of the lower legs was apparent although some incoordination and muscular weakness were evident when the patient walked. Neurological examination at this time was negative. The child continued to improve for a week and was dismissed, apparently normal.

Case 2. Female, white, aged 6. The chief complaints were symptoms of acute coryza and paralysis of the lower limbs, which had been present 24 hours. The patient was referred to the hospital by a physician who suspected poliomyelitis.

Physical Examination on Admission: Examination revealed fever of 102 F., muscle soreness and limitation of motion of the lumbar and highest thoracic segments, and signs of an upper respiratory infection.

Neurological Examination: Kernig's and Brudzinski's signs were present. There was loss in the tendon reflexes in the lower limbs. Babinski's sign and the abdominal reflex were present. The patient could move the lower limbs in bed but would not walk.

History of the Condition: Twenty-four hours previously the child had developed signs of an acute cold and was kept home from school. She had a moderate headache and was nervous and fretful. She had walked early in the day but later seemed content to stay in bed.

Diagnosis: A diagnosis of acute poliomyelitis was made.

Management and Course: The child was immediately put to bed and alternating hot and cold packs applied. Osteopathic manipulation was administered every 2 hours until the temeprature returned to normal, after which three treatments a day were given. Methionine was given for 7 days and then discontinued.

When the patient had been under treatment for 2 months, there was paralysis in the adductors of the lower limbs and considerable muscular rigidity in the muscles of the midcervical region. No paralysis developed in the upper limbs but there was paralysis in the lower limbs. There was little atrophy but the establishment of normal voluntary movement was slow. However, progress was considered encouraging. The Kenny method of muscle re-education was used.

2. *Pyramidal Tract Syndromes.*—The most common examples of pyramidal tract disease in children are cerebral diplegia, infantile hemiplegia, and Jacksonian fits. In these cases there is usually an associated involvement of the cerebral cortex and it is sometimes difficult to correlate the clinical symptomatology with anatomical changes, and it is impossible to classify these symptom complexes as an involvement of the pyramidal tract alone. Therefore, these cases present a difficult problem in management and the prognosis following classical treatment is poor. Osteopathic manipulative therapy and administration of metabolics have proved to be beneficial in some cases.

For ease in description both the chronic and acute types of pyramidal tract disease will be mentioned although the management will not differ. Many cases of birth injury fall into the classification of chronic pyramidal tract disturbances and will be considered with these syndromes.

a. Acute Pyramidal Tract Syndromes: Examples of this type of involvement are Jacksonian fits or convulsions. Before treatment of any neurological syndrome is begun the etiological factors should be determined if possible and removed. Then symptomatic treatment may be instituted. It is, of course, not always possible to follow this procedure, because the physician may first see the case in an acute exacerbation when palliative symptomatic treatment is imperative.

Convulsions are the result of excess irritation manifested by an acute motor response mediated by the pyramidal system. In the acute stage these convulsions require immediate treatment. The following procedure is usually successful in controlling the convulsions. The child is placed in a warm bath, with temperature between 90 to 100 F.[6,7] Cold compresses may be placed at the head during the bath. Following this the child should be placed in a darkened room and kept quiet. Traction to the cervical area may be applied during the bath or later; the pressure should be firm and steady but not too forceful and should be maintained for 3 to 5 minutes and released slowly. It is interesting to note that with such treatment sedatives or narcotics are rarely needed. Soft tissue technic applied to the entire spinal area immediately following the convulsion may aid in quieting the patient. Corrections of limitation of motion may be attempted at the physician's discretion.

Between the attacks treatment, which is directed toward the elimination of the etiological factors, usually falls into three chief classes which will be described briefly.

(1.) Correction of structural alteration

In most of these cases there is a structural alteration which is contributory at least to the acute motor exacerbations. A complete structural evaluation of the child should be conducted, including postural x-ray studies if necessary. The elimination of various areas of stress, particularly at the level of the second thoracic vertebra, assist in the elimination of irritative foci. Naturally, osteopathic manipulation is an important feature in the correction of such difficulties.

(2) Cranial technic

As an integral part of the osteopathic concept it is necessary to mention the use of osteopathic manipulation applied to the cranium. This technic has proved clinically to be of benefit in cases of pyramidal involvement. The mechanisms are not well understood and are extremely controversial and, therefore, will not be discussed in this paper.

(3) Detoxification program

As soon as possible detoxification should be started. In many cases the history of regular evacuation is elicited only to find later that laxatives are used indiscriminately or that the child is actually constipated. Regardless of the history, enemas (lemon juice) are given daily. Diet is limited for a week to semi-fluids with the elimination of all carbohydrates. Vitamins are used frequently in daily minimal doses. Methionine is used in an attempt to assist the liver in elimination of toxic products. The diet is a high-protein type, sometimes fortified by the use of dehydrated proteins. Although it is not a part of the regular program, sedatives may be used for a short period if the motor episodes are frequent and severe; however, their use is not often necessary.

b. Chronic Pyramidal Syndromes: Apparently the only difference between an acute pyramidal syndrome and a chronic one is the frequency and intensity of attacks, because the pathology is essentially the same and their management is similar. It is interesting to note the evaluation of their radical treatment by Ford.[8] He states that craniotomy is not justifiable, and furthermore that section of the sympathetic chain or nerves has no value in this type of neurological disease or in any other—that the procedure is based on an incorrect theory. Foerster's operation (which consists of severing the posterior spinal nerve roots) introduces, besides an element of trauma, ataxia to a condition which is already a difficult problem in management.

When chronic syndromes appear to be progressive a combination of glutamic acid and vitamins (pyridoxine, methionine, thiamine, and riboflavin) has been of some value; it is administered in conjunction with osteopathic manipulative therapy. The glutamic acid-vitamin combination produced no apparent alteration in the intelligence of the child, but that is not its purpose. Its purpose is to increase cellular metabolism in the central nervous system and to eliminate toxic products of general liver metabolism in an attempt to normalize function.

Case 3. Male, white, aged 3 months. The presenting complaint was "spells" (motor reactions) which had started about 3 weeks after birth.

History: Birth had been by breech presentation and although delivery was short, the head had been arrested in the suprapubic region.

History of the Present Condition: The convulsion began 3 weeks after birth. The same pattern was noted in all of the attacks. Convulsive movement began in the legs and spread to the arms. There had been as many as 15 to 20 attacks of this nature a day. They did not occur at night. Before admission to this clinic the child was placed under sedation which reduced the attacks to five or seven a day but did not alter the characteristic pattern.

Examination: Physical examination did not reveal anything remarkable. Laboratory and radiographic examinations revealed nothing.

Diagnosis: A diagnosis of traumatic (prenatal) epilepsy was made.

Management: Treatment recommended was osteopathic manipulative therapy applied to the cranium as well as to the spine in an attempt to restore normal circulation of blood and lymph in the brain and spinal cord. Milk minerals were advised to supplement the diet.

Course and Prognosis: During the course of treatment there were several minor gastrointestinal upsets and colds. The course, however, was one of steady improvement and the use of sedatives was discontinued several weeks after treatment was instituted. Eleven months later the motor episodes had been eliminated and coordination was normal and has remained normal.

3. *Extrapyramidal Syndromes.*—Most commonly lesions of the extrapyramidal system occur in the fifth decade or later. Knowledge of the function of the nuclei comprising the basal ganglia is somewhat incomplete, and probably the most common clinical involvement of these structures in children is that producing the choreic syndromes. Such conditions are characterized by involuntary movement, hypotonus, and incoordination.

It is impossible to offer any satisfactory analysis of the physiological factors involved and, therefore, it is extremely difficult to offer any adequate rationale of management of such syndromes. Doll and Phelps[9] advised re-education of muscle groups in an attempt to combat the unusual muscular activity produced by such lesions. Treatment should be instituted immediately and administered cautiously. Muscle re-education and massage are time consuming and such work may be assumed by a member of the family after suitable instruction. Surgical removal or an attempt to sever the pathways of the basal ganglia has not proved to be the answer in these cases; surgical procedures are not recommended to the extent that they formerly were.

Apparently the majority of syndromes involving the basal ganglia are vascular in origin. Perivascular cuffing and thrombotic blood vessels are described as the basic pathological alterations in such conditions and probably are the causative agents producing the symptoms.[10] In some cases these alterations are idiopathic but often are the sequelae of acute infectious diseases.

In several cases observed in this clinic there seemed to be a secondary liver disturbance, indicated by vague gastrointestinal dysfunction and reflex spinal rigidity. The disturbances in vascularization and the

liver dysfunction form the basis for the rationale of treatment in these cases, which is as follows:

1. Osteopathic manipulation is directed toward the areas of spinal rigidity which are found in the cervical and thoracic regions. Soft tissue and corrective technics are used where indicated. Osteopathic manipulation is applied to the cranium if examination reveals the need of structural correction there.

2. Metabolics are used routinely. These are glutamic acid, methionine and vitamins as mentioned above. The rationale is similar to that in other neurological pathologies, namely, the establishment of a normal blood supply and the removal of metabolic products.

3. Dietary supervision is useful in these cases, and elimination must be controlled. High protein intake is recommended with the elimination of starches from the diet. A high liquid intake is recommended but with the elimination of carbonated beverages. Some recommend as much as six pints of water each 24 hour period.[6]

4. Emotional supervision in these cases is important, and is especially true in this type of syndrome because embarrassment or strong emotional reaction has a tendency to increase the severity of the muscular reaction.

Case 4. Male, white, aged 8 years. The presenting complaint was involuntary muscular activity.

Examination: Physical examination was essentially negative. Neurological examination revealed a slight spasticity with a minor degree of involuntary motor activity. Laboratory examination was negative. No radiographs were taken and no spinal fluid examination made.

Past History: Birth was extremely difficult and the head was badly molded. The child progressed normally at first but the parents noticed that there was a slight stiffness in the muscles and the range of motion was somewhat restricted. There was very little nonvoluntary activity. Coordination seemed to be normal and the child made normal contacts with playmates. The child had been examined in other clinics and a diagnosis of extrapyramidal disease had been made.

Diagnosis: A diagnosis of mild extrapyramidal disease was made.

Treatment: The child was put on the detoxification program (amino acids) with osteopathic cranial adjustment twice weekly. Improvement was noted within a few months and progress was steady.

4. *Cerebellar Syndromes.* — Cerebellar dysfunctions do not reach the degree of importance in children that they do in adults. Such lesions cannot be classified as rare, but in many cases the primary pathology is elsewhere. It does not seem necessary to describe each of these conditions here as they will be discussed under other headings.

5. *Prenatal and Congenital Syndromes.*—Abnormalities of the central nervous system which arise before birth fall into two groups: First, the cases in which some part of the central nervous system is absent or incompletely formed and, second, the cases in which the structures of the central nervous system were completely formed, but in which destruction occurs due to toxemia or injury of the mother.

There is scarcely any portion of the central nervous system that is exempt from defect, and the clinical syndromes resulting from such lesions exhibit great diversity. The defect may be apparent at birth or may not become evident until much later, frequently as late as the eighteenth month. Defects are usually noted because of an arrest in normal growth and development.

Many cases are so extreme that they are institutionalized without any attempt at treatment in the home. Common examples of clinical entities of this group are cerebral dysplasia and congenital pseudobulbar palsy. Many such cases respond to osteopathic cranial adjustment, particularly when the anomaly is produced by birth trauma or postnatal encephalitis.

It might be well to mention congenital internal hydrocephalus at this time. This condition should always be considered if the head is large at birth or appears to grow abnormally fast. There is no medical treatment recommended for this defect. Dandy[11,12] has developed several surgical procedures which have corrected some cases of blockage of the third ventricle. It should be stressed that all of these blockages are not complete and some of them respond to cranial adjustment. Because of this response it seems advisable to recommend such treatment before surgery is employed.

When a diagnosis of incomplete development or organic destruction of the tissue of the central nervous system has been established there is only symptomatic treatment to recommend. The prognosis of these conditions is invariably poor. The amentias fall into such a classification, and the management of such cases does not belong in a discussion of this type.

However, it should be mentioned that there is a tendency to classify children as mental incompetents when there is no justification for such an opinion.[13] Such a diagnosis should be regarded with a certain amount of skepticism. In about 40 per cent of so-called hopeless cases an organic derangement has been discovered which was amenable to treatment. In some cases there is a subclinical vitamin deficiency which has been ascertained by radiographic examination; these cases respond to amino acid and vitamin therapy. In all cases an osteopathic structural examination was made and osteopathic manipulative treatment, both spinal and cranial, was administered when indicated. Results have been satisfactory because all of these cases had been pronounced as hopeless by classical methods of diagnosis and treatment.

There are a number of heredofamilial and degenerative diseases of the central nervous system for which there is no known treatment and in which the prognosis is poor. These cases have several characteristics in common, although the clinical picture may be extremely diversified. There is a degeneration of or absence of some part of the central nervous system. Naturally, where there is an absence of a functional element, there is no treatment.

Even when the physical examination indicates the presence of birth injury, the prognosis is not hopeless, although the symptomatic response may be disappointing. Treatment must be continued for long periods—at least 12 months—and if any improvement is evident after that time, treatment should be continued up to 5 years. Parents may become discouraged, for even at best the rate of recovery is slow. The rationale of management is similar to that in the syndromes already described, that is, all efforts are directed toward the restoration of normal function as well as toward symptomatic relief. By the use of

osteopathic manipulative therapy and the metabolics, there may be sufficient normalization to permit the natural reparative processes of the body to become predominant and produce a relatively normal individual.

Case 5. Female, white, aged 18 months. The presenting complaint was hydrocephalus.

History: The condition of hydrocephalus was apparently present at birth and was complicated by a severe systemic infection at the age of 4 months. The nature of this infection was unknown, but it was believed to be meningitis. The hydrocephalus became more apparent following this infection and cisterna puncture was necessary 4 to 6 times weekly.

The patient was brought to the clinic when bulbar symptoms were becoming evident. Surgery had been offered as the treatment, but as the chance of survival was estimated to be one in a hundred, it was refused by the parents.

Examination: Physical examination revealed a child in poor physical condition. The hydrocephalus was evident. Radiographic examination showed extremely dilated ventricles.

Course and Management: On admission the child was treated palliatively in an attempt to improve digestion and the general condition. A diet was devised that was tolerated by the child and dietary supplements were given orally. Osteopathic manipulative treatment of the cranium was instituted twice daily and soft tissue treatment was administered to the spinal area once daily. It was necessary to perform a cisterna puncture on arrival, but no other. The child was relieved of gastrointestinal upsets and seemed to improve slightly. Manipulative treatment (spinal and cranial) was carried on for about 7 months with little improvement. The child was taken home.

Prognosis: The prognosis, of course, was poor. It was the opinion of the staff that continuing the treatment would have prolonged life, but there was no chance of further improvement. The child died 7 weeks later.

Case 6. Male, white, aged 8 years. The presenting complaint was slight mental underdevelopment. The child could not learn to read and was inattentive at school.

History: The boy had had a normal childhood. A younger sister was normal. The family background was good; however, it was felt that the parents feared mental incompetency but would not admit it.

Examination: Physical examination was negative. Radiographic examination of the hands revealed that there was subnormal bone development, and that the growth age was below the mental and chronological age.

Management: The child was put on vitamin supplement and assisted by remedial reading. Within 8 months he was doing normal school work and was much better adjusted emotionally.

6. *Autonomic Syndromes.* — Few neurological syndromes are classified as disturbances of the autonomic nervous system. There are, however, few degenerations or alterations in neural structures that do not influence the autonomic nervous system to some extent. Besides the two peripheral divisions of the autonomic system, the sympathetic and the parasympathetic, there is clinical and experimental evidence that there are higher suprasegmental centers in the brain stem and cerebrum that are important when considering the activity of the autonomic nervous system. These centers are located in the hypothalmic region, the cerebral cortex, and the medulla.[14]

It is not necessary in a discussion of this type to describe in detail the effects of lesions in these areas on the function of the autonomic system. Briefly, lesions of the hypothalamus result in hypothermia, adiposogenital dystrophy, somnolence, and pubertas praecox. There is no question but that the function of the autonomic nervous system is concerned with general visceral activity and it follows that disturbances in function of this system, however minor, are observed clinically.[5] These symptom complexes are diffuse and difficult to recognize, the only well-defined syndrome being that of Horner, which is relatively rare in childhood.

It may be stated that it is probable that a lesion in the cerebrospinal axis or the peripheral segmental nerves will affect the function of the autonomic nervous system. It has been shown experimentally[15] that there is an autonomic imbalance following the production of an experimental osteopathic vertebral lesion and the osteopathic lesion is always found associated with neurological pathologies.

It can be understood why it is difficult to attempt a classification of disturbances of the autonomic system. A general statement may be made concerning its function — that vague gastrointestinal disturbances, nervousness, irritability, and emotional instability are symptoms which indicate a disturbance in the autonomic nervous system. Osteopathic manipulative therapy is indicated in such cases. Management should also include correction of dietary deficiencies and general hygienic measures. It has been stated that it is probable that osteopathic manipulation produces its effects through the autonomic control of the vascular supply and that children respond remarkably well to such measures.

7. *Neuromuscular Syndromes.*—These syndromes are usually discussed with the diseases of the central nervous system. However, the etiology of a number of these conditions is unknown and, therefore, a satisfactory classification or rationale of management is impossible.

It is a well-known fact that the formation of muscles *in utero* is inconstant and in the adult there are many malformations usually not noted except at surgery or autopsy. These usually are not incapacitating and do not offer any problem in management.

Congenital contractures of muscle are sometimes encountered and after the diagnosis has been established several courses of management are open to the physician. The first is manipulation, massage, and hot packing. If the response to such treatment is inadequate, surgery must be employed to lengthen the muscle.

The heredofamilial diseases or muscular dystrophies are the largest and most common group of diseases in which there is an involvement of the motor unit. No treatment of any value is offered to arrest their progress. Ford[8] states that exercises and massage are of some aid in improving the efficiency of the muscle tissue remaining, and passive movements and orthopedic procedures are sometimes indicated to prevent contractures and deformities. The patient should not be permitted to grow fat but nutrition must be maintained.

It can be seen from the above description that little can be accomplished when the cause cannot be

removed. Osteopathic manipulative treatment directed toward the entire spinal area seems to retard the progressive muscular dystrophy but cannot be considered more than palliative. Metabolics have not been used enough in this type of case to allow any definite conclusion concerning their value.

SUMMARY OF THE RATIONALE OF MANAGEMENT

Throughout the foregoing discussion methods of management have been mentioned and obviously there has been a similarity even though the symptom pictures have varied widely. It seems indicated, at this point, to explain why such management could be effective in all cases.

1. *Osteopathic Manipulative Therapy.*—Soft tissue manipulation has been recommended in all cases because of the contracture of the paravertebral muscles which is always present. The attempt is made to eliminate reduction in vertebral motion. Although corrective technics are used, it is not felt that they are essential to produce a therapeutic effect.

It has been shown experimentally that vertebral lesions produce vascular alterations in the tissues of the central nervous system.[14,15] It is conceded that the underlying pathology in most neurological syndromes is either a primary or secondary alteration in the blood supply to the part of the central nervous system that is primarily involved. Such alterations are many times the result of an autonomic imbalance involving the vasculature of the nervous system and, therefore, is amenable to osteopathic treatment.

2. *The Metabolics.*—The medications that have been used in the management of the cases under discussion are all found in the living body[1] and regulate various aspects of metabolism. The object of their administration is to aid the body in normalizing cellular chemistry, the disorders of which are grossly reflected as metabolic or degenerative diseases.

Glutamic acid is an amino acid used for its therapeutic action in neurological conditions because it is the amino acid in the central nervous system that is essential for cellular metabolism. NRTP is a mixture of niacin, riboflavin, thiamin, and pyridoxine and is used as a vitamin supplement with methionine for frank vitamin deficiencies.

3. *Physical Therapy.* — Physical modalities are used in an attempt to restore function and to increase the blood supply to a given part. They are useful but should not be used to replace osteopathic manipulative treatment to vertebral or soft tissues.

Alternating hot and cold packs are classified as physical therapy and certainly are useful in continuing treatment when manipulation cannot be obtained and in supplementing osteopathic manipulation. The purpose of packing is to stimulate and inhibit the blood flow to a certain part, in an attempt to produce normalization of the blood supply. Osteopathic manipulation is more effective in this regard than the packs but the patient should have the benefit of both.

Galvanic stimulation is used to stimulate certain muscle groups that have apparently lost their nerve supply and is a useful device but should not be relied upon entirely; it may do more harm than good if not intelligently applied. It will serve to maintain tonicity and aid in the metabolism of the muscle fibers until a normal innervation can be established.

Passive motion is helpful and can be used in conjunction with muscle re-education.

For the best results all of the modalities available should be used. Even with such management, it may not be possible to effect a complete cure. However, the osteopathic physician has more to offer than physicians of any other school of medicine.

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ACKNOWLEDGEMENT

The writer wishes to thank Perrin T. Wilson, D.O., for reviewing the manuscript and for making many valuable suggestions.

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RHEUMATIC FEVER

The seriousness of the rheumatic fever problem has at long last been recognized. Public-spirited organizations and the medical profession have joined hands in a concerted effort to procure funds for research and for the dissemination of the knowledge already accumulated on the symptomatology, diagnosis and treatment of rheumatic fever. In 1948 there were 22 state and 22 private rheumatic fever programs.

Angove reported that rheumatic fever kills more than five times as many persons annually as poliomyelitis, pertussis, diphtheria, scarlet fever, measles and meningitis combined. For every case of poliomyelitis in the age group 5 to 15 years there are 111 cases of rheumatic fever, and for every death from poliomyelitis there are 154 deaths from rheumatic fever.

Martin has estimated that each year 40,000 persons die from rheumatic fever and its sequelae in the United States, and that between 800,000 and 1,000,000 new cases develop annually. Rheumatic fever ranks first as a cause of death for girls in New York City and is second only to accidents for boys.—Robert G. Shirley, M.D., *California Medicine,* February, 1950.

Skeletal Metastases, With Special Reference to Their Origin and Treatment*

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The historical background of skeletal metastases is woefully lacking but it has been definitely established since Samson in 1834 described the first case of bone metastasis[1] that one of the common sites of metastatic deposits of malignant tumors is the skeleton.

Skeletal metastases may arise from malignancy of any organ. However, secondary bone tumors are most likely to occur in carcinoma of the breast, prostate, kidney (hypernephroma), and lung, but many other malignancies which will subsequently be discussed may be the starting point of secondary deposits.

Prior to 1910 accurate information relative to the location of metastases was gained only by physical examination and at the autopsy table. In general this afforded trustworthy evidence in bones that were the common site of pathologic fracture or that were easily accessible at postmortem examination. However, since the advent of radiography, films of the entire skeleton have made for greater accuracy and have facilitated the study of the incidence of bone metastases in various parts of the skeleton.

In considering the biology of bone metastases it should be borne in mind that in certain parts of the skeleton lesions are for the most part osteolytic (osteoclastic) and are strictly destructive, while in other parts they are osteosclerotic (osteoplastic) and are bone-producing or sclerotic lesions. Then there is the mixed form which is a combination of the osteolytic and the osteoplastic form such as is occasionally seen in metastasis from carcinoma of the breast. The most common osteolytic bony lesions are from carcinoma of the breast, thyroid, kidney (hypernephroma), testes, and lung, while the outstanding osteoplastic lesion is from carcinoma of the prostate.

Different parts of the skeleton differ in frequency as to the site of metastasis, the most frequently affected being the spine, particularly the lumbar vertebrae; the pelvis and the adjacent parts of the femur are next in frequency. Von Recklinghausen believed that the lumbar spine and pelvis were most frequently involved because these areas were subject to the greatest stresses and strains. Were this a decisive factor, metastases would be found not only in the lumbar spine and pelvis but also in the lower extremities, especially the feet. The lower extremities from the knees down are practically free from metastases as are the upper extremities distal to the elbow. According to Borak[1] it is not the greater static but rather the less dynamic usage which predisposes to the development of bone metastases. In parts of the skeleton which are less used dynamically, such as the lumbar spine, conditions are better for the retention of carcinomatous cells which are brought through the blood stream or lymphatic permeation.

*Presented at a combined session of the American Osteopathic College of Radiologists and the Osteopathic College of Orthopedists at the meeting in Detroit, October 11, 1949.

Von Recklinghausen[2] was among the first to foster the embolic theory of metastatic spread by the blood stream while Handley[3] later presented the view that cancer is disseminated to bone by permeation of the lymphatics. This view is supported by more recent investigators such as Carnett and Howell.[4]

It was formerly believed that metastatic spread from carcinoma was by way of the lymphatics while sarcoma metastasized by way of the blood stream, which seemed to be a satisfactory explanation for the rapid spread of sarcoma in contrast to the slower metastasizing carcinoma. However, evidence now indicates that beginning metastatic spread is by lymphatic channels close to the point of origin and that more distally it becomes hematogenous.

Also of biologic interest is the fact that bone metastases develop infrequently in the cortex but for the most part in the medullary cavity.

In the past 20 to 25 years the management of metastatic bone malignancy has progressed rapidly. It used to be that palliation by narcosis was about the only therapy available. Now radiation therapy is available for the relief of pain, to produce castration in many instances, and to fibrose metastatic processes. Sex hormones and calcium in its various forms have been found useful. Colloidal lead has been brought into use and more recently the radioactive isotopes. With present day methods it is not unusual for patients with skeletal metastases to survive quite comfortably from 3 to 5 years.

Metastases from Breast Cancer.—In discussing the primary tumors producing skeletal metastasis it is perhaps well to discuss first breast carcinoma which is one of the most frequent primary tumors metastasizing to bone. The bones most frequently involved are those of the spine, pelvis, femur, skull, ribs, and humerus. These metastatic lesions when first discovered are sometimes single but more often are multiple. There are two general types:

1. The first is the osteolytic type which is by far the most common and is characterized by areas of bone erosion with destruction of trabecular pattern of the cancellous or cortical portion or both. The process may be more or less diffuse or it may be sharply circumscribed by punched out areas which must be differentiated from those seen in multiple myeloma and hypernephroma.

When the pelvic bones are involved there is not infrequently an associated invasion of the heads of the femurs which according to Geschickter and Copeland[5] seems to be by direct involvement through the ligamentum teres which helps to establish proof of tumor extension by way of the lymphatics. Involvement of the humerus and the shoulder girdle is less frequent, but when it does occur, the same type of destruction follows.

The conditions simulating the osteolytic metastatic process are (1) solitary bone cysts, (2) multiple

myeloma, and (3) osteogenic sarcoma. The solitary bone cyst may be differentiated from metastatic carcinoma by signs of ossification of the margins of the lesion. The cystic lesion is without symptoms in contradistinction to the metastatic process which is accompanied by pain and dysfunction of the part. From the radiograph it may at times be almost impossible to distinguish between metastatic carcinoma and multiple myeloma. However, the Bence-Jones proteinuria occurs in cases of multiple myeloma more frequently than in cases of metastatic carcinoma. Osteolytic osteogenic sarcoma may produce changes similar to metastatic carcinoma but such an area has a tendency to be asymmetrically located in the bone and destruction is usually more rapid with a rather violent periosteal reaction.

2. The second type of metastatic bone lesion from breast carcinoma is the osteoblastic form which presents a very different picture. The radiograph reveals areas of marked increased density in which the trabecular pattern is no longer identified as it has been replaced by dense sclerotic bone. It would seem that the osteoplastic form is characteristic of the more chronic or slow-growing metastases and has to be differentiated from the type of lesion seen in carcinoma of the prostate and in Paget's disease.

The approach to treatment of metastases of breast carcinoma is varied. The mode uppermost in the radiologist's mind is, of course, radiation therapy administered according to his judgment and experience. Radiation therapy usually includes not only treating the metastatic lesions themselves but also administering castration dosage to the female still in the menstrual age period. Palliation is the prime objective and the relief of pain is important. Inasmuch as the majority of the lesions occur in the lumbar spine and pelvis it has been our practice at Detroit Osteopathic Hospital to cross-fire the involved areas with 10×20 or 20×20 cm. ports according to the extent of involvement. The factors utilized are 200 kv. p., 20 ma., using a composite Thoreas filter with half value layer of 1.3, 50 cm. focal skin distance administering 700 to 1200 roentgens to each port according to the amount necessary for analgesia. Treatment is daily giving 150 to 250 roentgens to a single port.

The question of sterilization in women of the childbearing age who have metastasizing carcinoma of the breast is one that has not as yet been definitely answered but in many instances roentgen treatment directed to the pelvis with consequent sterilization has resulted in partial or complete recalcification of metastatic bone foci far removed from the area exposed to irradiation with no therapy directed to the local lesions. Another method of castration utilized is the daily injections of testosterone proprionate. These injections combined with the administration of calcium and vitamins have on occasion resulted in the healing of ununited fractures.

Metastases from Prostatic Cancer.—The great osteoplastic producing tumor is that of the prostate and it occurs frequently. The bones most frequently involved are those of the pelvis and vertebrae, most commonly those of the lumbar area. When such conditions occur the pain is excruciating in the affected bones.

The roentgenograms show marked increase in bone density. In cases with doubtful palpatory findings in the prostate gland, diagnosis is aided by serum acid and alkaline phosphatase determinations.

The reaction of bone to carcinoma of the prostate is markedly different from that seen in other types of bone metastases in that the tumor invasion rate is slow enough that proliferation of the bone can keep pace with it. From the standpoint of radiographic differentiation of metastatic carcinoma of the prostate, the diseases to be considered are Paget's disease (osteitis deformans) and Albers-Schönberg's disease.

The differential diagnosis from Paget's disease can usually be made because metastatic carcinoma, despite the new bone formation about the cortical zone, usually produces lytic changes in the medulla, which is not the rule in Paget's disease. Involvement and bowing of the femurs and tibias are common in Paget's disease but rare in metastatic carcinoma. The skull changes in Paget's disease are characterized by the thickening of the calvarium. It has been our experience that in Paget's disease the changes produced in the pelvis and proximal femurs present a criss-cross lacework appearance which is not so in metastatic carcinoma. In Albers-Schönberg's disease (marble bones) the bones are densely sclerosed to a point of homogeneous whiteness and practically the entire skeleton is involved.

As to the modes of therapy in metastases from carcinoma of the prostate, roentgen therapy offers some relief from pain but is not effective in eradicating the lesion. Herbst[6] was among the first to show beneficial results by the use of orchidectomy and estrogenic therapy and MacCarty[7] at the Hitchcock Clinic in Hanover, New Hampshire, has reported some excellent results from orchidectomy followed by maintenance doses of stilbestrol. The clinical and radiographic evidences of improvement included relief of pain, increase in red blood cell count, decrease in size of the tumor, decrease in bony metastatic lesions, improved appetite, and gain in weight. The serum acid phosphatase levels were lowered and lowered sedimentation rate also was noted. Geschickter and Copeland[4] postulate that antiandrogenic therapy of prostatic cancer demonstrates that a clinical change in the internal environment of the host has brought about regression of a malignant neoplastic process.

Metastases of Kidney Tumors.—The so-called hypernephroma, first described by Grawitz,[8] frequently metastasizes to bone and the bones most commonly affected are the humerus, spine, femur, pelvis, and ribs. The lesions are osteolytic and destroy the cortex from within with no expansion. The difference radiographically between hypernephroma and metastases of breast carcinoma is that in hypernephroma the lesions tend to be single and are strictly osteolytic.

Hypernephroma is a radioresistant lesion and to arrest the metastatic process by roentgen therapy is not to be expected but palliation is often accomplished by such dosages as were discussed under carcinoma of the breast. Also in the control of pain injections of oil-soluble calcium have been used.

Metastases from Uterine Cancer. — Metastases from uterine carcinoma are rare but in instances where they do occur the cervical portion seems to be responsible. The bony lesions are destructive and there is nothing characteristic to set them apart from other osteolytic metastatic lesions. The methods of radiation therapy previously mentioned are suitable for the metastatic lesions from the cervix uteri.

Metastases from Thyroid Cancer. — Metastases from carcinoma of the thyroid rank in frequency with the bony lesions from carcinoma of the breast and

prostate. The metastatic processes have an affinity for the epiphyses and the bones affected are the sternum, skull, ribs, spine, humerus, pelvis, and femur.

Metastases from Gastric Cancer.—In the minority are metastatic lesions from the gastrointestinal tract, especially the stomach. In practically all cases reported an osteoplastic type of lesion was found. In Sutherland's[9] experience lesions were found in the ilium, ischium, and upper humerus, and the cervical, thoracic, and lumbar vertebrae and ribs.

Metastases from Pulmonary Cancer.—In carcinoma of the lung a wide variety of bones have been found involved, including not only areas in the spine, pelvis, ribs, and skull but also below the knee and elbow and even in the carpal bones. The lesions are osteolytic but may show slight formation of new bone within the destructive process.

Treatment by external radiation gives symptomatic relief at best and may prolong the patient's life for only a short time. In the presence of infection, radiation therapy may reduce the cough, expectoration, and occasionally the chest pain. Also atelectatic areas at times show temporary resolution.

Metastases from Suprarenal Tumors.—It has been our good fortune to observe two cases of neuroblastoma within the past year. They were both of the Hutchinson type showing a predilection for bone in contrast to the Pepper type which has an affinity for the liver.

The lesions are resorptive and may affect the entire skeleton including the skull, but more especially the long bones and pelvis. Exophthalmos may be a metastatic manifestation in the region of the orbit which must be differentiated from Christian-Schüller xanthomatosis. The latter produces rather large, well-circumscribed defects in the skull and flat bones, while the lesions of neuroblastoma are small and diffusely distributed.

Neuroblastoma is a malignancy of children under 5 years of age, so in order to differentiate it completely from other osteolytic processes of the same age period we must consider the leukemia of the lymphoid type and Ewing's endothelioma. Lymphatic leukemia may be differentiated by its rapid response to radiation therapy and the relative leukocytosis of the differential white cell count. Ewing's endothelioma is characterized by the fact that most often the long bones are affected with a longitudinal splitting of the periosteum which responds almost magically to radiation therapy.

CONCLUSIONS

1. Skeletal metastases may arise from malignancy of any organ.

2. Skeletal metastatic lesions are of osteolytic or osteoplastic types.

3. Metastatic spread is both by lymphatic and hematogenous routes.

4. Radiation therapy is most effective in the alleviation of pain in skeletal metastasis.

5. Hormonal and estrogenic therapy in skeletal metastases from breast and prostatic carcinoma has proved of definite value.

6. The approach to treatment in skeletal metastasis remains largely an individual problem and subject to the judgment and experience of the radiologist.

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RESEARCH PROBLEMS IN CORONARY HEART DISEASE

Researches in coronary heart disease until very recently have been largely in the field of statistical incidence, pathology, diagnosis, prognosis, and empiric therapy. Now and then there have been in the past flashes of interest in the etiology and pathogenesis stimulated on occasion by observations and questioning of a few far-sighted persons like Timothy Leary of Boston, but in general an attitude of fatalism, indifference, or hopelessness has held in check the curiosity of the medical world. "It is God's will" has been more or less the unspoken attitude of both laymen and doctors ever since the first description of a possible relationship between coronary sclerosis and obstruction on the one hand and symptoms and death on the other as recorded about 250 years ago by Theophilus Bonetus and his contemporaries. It is, however, perfectly clear to us now that we must assume something better than a passive attitude towards the increasing threat to the activities and lives of many young and middle-aged persons which results from the development of serious coronary atherosclerosis.—Paul D. White, M.D., and Constantin Ferrero, *Annals of Internal Medicine*, July, 1949.

THE JOURNAL OF THE
AMERICAN OSTEOPATHIC ASSOCIATION

Published monthly by the American Osteopathic Association

Publication Office, 100 S. Kenilworth Ave., Oak Park, Ill.
Editorial Office, 212 E. Ohio St., Chicago 11, Ill.
Address all communications to the Chicago Office

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Vol. 49 March, 1950 No. 7

OSTEOPATHIC RESEARCH

The importance of research to the osteopathic profession is not a new subject. It has occupied a prominent place in the thinking of leaders of the profession, particularly in recent years. Recognizing the need for expansion of research effort and knowing its cost, the Board of Trustees of the American Osteopathic Association voted last July in St. Louis to include research in the Christmas Seal program. The results of the first campaign, while greater than in any previous year, were not up to expectations which indicates that many individuals are unaware of the urgent need for and full significance of osteopathic research.

In order to bring to all osteopathic physicians information concerning projects under way, the need for further undertakings, and methods of making progress, a series of articles is being published in THE FORUM OF OSTEOPATHY. The first of the series appeared in the March issue. Titled "Osteopathic Research Comes into Its Own" and written by Dr. Alexander Levitt, Chairman of the Committee on Research of the American Osteopathic Association, it succinctly states the purpose of research:

> . . . the purpose of osteopathic research is the critical study of biologic phenomena which are pertinent to the osteopathic concept of health and disease—disease, the study of man in relation to the world in which he lives. Osteopathic research includes critical, scientific investigation, interpretation, and assimilation of reliable and verifiable data which has been found or shall be discovered in the osteopathic sciences, and the integration and application of all these processes to human welfare.

Dr. Levitt points out that the Committee on Research believes there is much work to be done in the interest of public welfare and suggests the following four ways in which progress can be made:

1. Each osteopathic institution — college, hospital, and clinic — should be engaged in research in at least the basic osteopathic sciences.

2. Each auxiliary and allied organization concerned with one or more specialty practices in osteopathy should be engaged in scientific inquiries which will lead to better osteopathic methods in curative and preventive medicine.

3. Each osteopathc physician should prepare complete and accurate case histories for assistance to osteopathic scientists who may seek critical clinical evidence of biologic phenomena. Also, through use of such case records, the individual osteopathic physician should engage alone or with others in clinical studies of diseases, and factors which may be responsible for them.

4. Last, but not least, research workers should be carefully selected and trained in the osteopathic sciences. In training for research, the individual requires special aptitudes, skills, motivation, good health, and reasonable security.

The April FORUM will carry an article by Dr. H. Dale Pearson, President of the American Osteopathic Association, entitled, "Research in the Doctor's Office." This article will elaborate the third suggestion made by Dr. Levitt. Dr. Pearson emphasizes that while "research" is likely to be connected with "big" things in the mind of the average person, this is not necessarily true. Good case histories, good physical examinations, and effective treatment recorded by the individual physician as he carries on his daily practice could constitute the first step in correlating useful, much-needed information. In short, all that is necessary "to make the doctor's office a basic research laboratory is the recording of what he finds, what he does, and the results he obtains when what he does corrects what he finds."

The final article in the research series, "The Future of Osteopathic Research," will be presented by Dr. Allan A. Eggleston, Chairman of the Department of Professional Affairs, in the May FORUM. Dr. Eggleston says,

> The American Osteopathic Association made the largest grant to research in the history of the organization during this present year. . . . The cost of osteopathic research programs now in progress exceeds the amount made available by the Association. Our present research activities are made possible by supplementary grants from sources outside the profession. It is obvious that the profession must earn the right to seek financial assistance in carrying out a growing, constructive, and productive research program.

Those who give attention to the impressive series of articles in THE FORUM will surely be convinced, along with Dr. Eggleston, that "The future of osteopathic research will determine, to a great extent, the future of osteopathy." Those who are truly interested in the future of osteopathy will continue to or will be led to contribute to that future by means of financial support and participation in basic clinical research.

ANTIHISTAMINE PREPARATIONS

Since late in 1947 reports have been appearing in medical publications concerning the effectiveness of various antihistaminics against the common cold. Since certain of the preparations were freed by the United States Food and Drug Administration for sale over the counter a veritable flood of material has inundated newspapers and magazines. Unbounded enthusiasm has characterized much of this writing and practically all of the advertising.

Being free to purchase any one of the considerable number of antihistamine preparations, which have been rushed onto the market by drug manufacturers, and having been informed of their wonderful efficacy

by omnipresent advertisements, the sufferer from a "cold" is very likely to make a purchase and try an experiment. Should his manifestations be of an allergic nature, the chances are good that he will be relieved. If his ailment is a virus cold, the chances for a quick recovery are less good. For at present there is no conclusive proof that the antihistamine drugs cure the cold of virus origin.

A recently published report* evaluated the articles which have purported to prove the therapeutic and prophylactic properties of the antihistaminics against the common cold. The conclusion reached was that the "evidence so far presented should be properly classified as the honest opinion of the investigators and not as fact."

Even more significant for the user than the possible lack of therapeutic efficacy are the undesirable side effects of the antihistamine preparations. Disturbances in appetite, nausea, lessened ability to perform jobs, sleepiness, nervousness, and palpitation of the heart are likely to result in about 20 per cent of persons taking them. While these symptoms are not in themselves hazardous, they may be the cause of serious accidents. In some quarters there is beginning to be a suspicion that the large doses of antihistaminics taken by some people are inimical to the heart.

In view of the inconclusive evidence of the effectiveness of the antihistaminics against colds and of their known and suspected untoward effects, physicians would seem to be well advised to warn against their extensive and unsupervised use. If advertising is not controlled voluntarily, measures to control it should be taken by the proper agencies.

A NEW EDITORIAL POLICY?

An editorial† in *The Journal of the American Medical Association* for January 28, 1950, speaking of new antibiotics, says, "Final judgment must be reserved until adequate clinical experience has been gained with them. One has to keep in mind also that susceptibility of micro-organisms to antibiotics varies greatly. Furthermore, *patients, and not their microbes, are treated. Drugs only repress the growth of infectious agents until the body can develop its own defenses.*" (Italics supplied.)

That appears to be sound principle. *The Journal of the American Medical Association* has a new editor. Dare we hope that the editorial policy of that publication is undergoing real modernization and the human body's own reparative powers will get a little credit for the body's recovery from disease?

Perhaps old-school medicine for a long time has held the theory that the body heals itself. However, it could never have been guessed from *The Journal of the American Medical Association* and particularly the editorial columns therein.

Andrew Taylor Still and his school of practice have emphasized for half a hundred years that the body does have the ability to develop its own defenses and, by so doing, to overcome disease. The osteopathic profession has met with nothing but scorn and ridicule from old-school medicine for daring to promulgate such a theory.

In the past, with *The Journal of the American Medical Association* under the editorship of Morris Fishbein, it was difficult to understand how any author managed to penetrate the iron curtain of medical bigotry and prejudice to the extent of having printed in that publication anything that might faintly resemble the theories expounded by Still.

A review of the allopathic literature for the past decade, dealing with what we all know to be simon-pure osteopathy, reveals some rather feeble attempts at rationalization concerning the use of manipulative procedures to bring about relief or cure of lumbosacral problems. They might be considered ludicrous if they did not involve definite hardships on the part of the patient.

Many authors, in their zeal to alleviate a vexing low-back problem, advocate a preliminary utilization of many of the "orthodox" physiotherapeutic measures followed by what they refer to as "judicious manipulation;" others resort to the injection of procaine intramuscularly, followed by vigorous kneading of the tissues. The theory would seem to be—if one modality does not produce results, the other might.

Perhaps some day, the dominant school of medicine will become mentally alert and intellectually honest enough to cast aside blind bigotry and prejudice and really make a sincere attempt to live up to the Hippocratic Oath and to bring to suffering humanity everything good in diagnosis and therapy—including a thorough knowledge of the osteopathic lesion. The January 28, 1950, issue of *The Journal of the American Medical Association* gives us indication that perhaps this day is dawning. It is devoutly to be hoped that we have not spoken too soon.

E. H. McKenna, D.O.

DR. GEORGE J. CONLEY

The death of Dr. George J. Conley, aged 78, on February 24 at Kansas City, Missouri, has deprived organized osteopathy of one of its most distinguished physicians, surgeons, and educators.

George J. Conley literally grew up with osteopathy in one of its colleges and hospitals in the capacity of physician, surgeon, writer, teacher, and administrator. He will be best remembered for his contributions to surgery and as a teacher. Under his guidance all of his students were imbued with the philosophy of osteopathy and many of his sage aphorisms rival those of Osler.

Dr. Conley led a busy and fruitful life. Even in his advanced age, he was widely called upon to continue his teaching and appeared on the lecture platform in the capacity of guest speaker at many meetings of the profession.

He was born December 3, 1872, in Paxton, Illinois, and graduated from Larned, Kansas, High School in its first graduating class in 1890. He attended the School of Sanitary Engineers, Purdue Uni-

*Status report on antihistaminic agents in the prophylaxis and treatment of the common "cold." Report of the Council on Pharmacy and Chemistry. J. Am. M. A. 142:566-569, Feb. 25, 1950.

†Editorial: New antibiotics, J. Am. M. A. 142:260, Jan. 28, 1950.

versity, Lafayette, Indiana, and later graduated from the National School of Osteopathy, Kansas City, Missouri in 1901. He practiced for 6 months after graduation in Thayer, Missouri, and then went to Kansas City where he practiced until his death. He was awarded the M.D. degree from Eclectic Medical University, Kansas City, Missouri, 1902, and was licensed in Missouri, Oklahoma, and Kansas.

Dr. Conley was one of the founders of the Kansas City College of Osteopathy and Surgery in 1916 and held the chair of principles and practice of surgery until the end of his life. He was president of the college from 1916 through 1940 and at the time of his death he was emeritus president of the Board. With Dr. A. A. Kaiser he was instrumental in establishing the *College Journal*, the official organ of the College.

In spite of his full schedule of teaching and practicing, Dr. Conley found time to contribute his invaluable administrative abilities to organized osteopathy. He was president of the Missouri Association of Osteopathic Physicians and Surgeons from 1915 to 1917. He served the American Osteopathic Association in many ways from 1930 through 1940 and in 1934 was elected its President. He was a fellow and charter member of the American College of Osteopathic Surgeons and served as its president in 1933. He founded Lakeside Hospital, Kansas City, Missouri, and served as its president from 1923 to 1938. The Conley Clinical Hospital was named in his honor.

Many honors came to Dr. Conley during his lifetime. In 1941 the American Osteopathic Association awarded to him the Distinguished Service Certificate and in 1947 the College of Osteopathic Physicians and Surgeons, Los Angeles, awarded him an honorary Doctor of Science degree. He is listed in Who's Who in America. He was a member of Iota Tau Sigma, Kansas City Club, and Kansas City Chamber of Commerce. Many of his articles appeared in American Osteopathic Association publications.

The career of a most distinguished osteopathic physician has ended. He will be remembered as one who contributed much to the raising of osteopathic educational standards through the years when osteopathy was struggling against great odds. His was a lifetime of service to organized osteopathy. He did his work and he did it well. The osteopathic profession, and indeed humanity, is better because he lived.

E. H. McKenna, D.O.

DR. JOHN E. ROGERS

John E. Rogers, Doctor of Osteopathy, and one of the most widely known members of the profession, died February 25 after a brief illness. He was born October 3, 1884, at Scales Mound, Illinois, where he graduated from high school in 1901.

Dr. Rogers came to osteopathy with a splendid educational background. He attended Warren Academy during 1902 and Epworth Seminary during 1903 and was awarded the degree of Bachelor of Arts by Lenox College, Hopkinton, Iowa, in 1907. In 1911 he received his Master of Arts degree from Northwestern University. Later he was athletic director at Epworth Seminary and Montana Wesleyan University. He was dean of the Faculty of Billings Polytechnic Institute for 3 years. He was awarded an honorary degree of Ph.D. by Lenox College in 1917.

During World War I Dr. Rogers was commissioned as Captain in the Medical Corps of the 91st Division. He graduated from the Des Moines Still College of Osteopathy in 1924 and began practice in Wisconsin the same year, first in Watertown, and later in Oshkosh where he practiced until the time of his death.

Very few osteopathic physicians have enjoyed such a diversification of interests as did Dr. Rogers. He gave to all of his interests a full measure of his intellectual abilities and enthusiasm. His hobbies included boating, sports, photography, vocational counseling, and the raising of pedigreed Scottish terriers. In connection with his canine ventures he had his own radio program, The Kennel Hour, and edited the Scottish terrier section of a widely known magazine, *Dog News*.

He was elected president of the Wisconsin Association of Osteopathic Physicians and Surgeons in 1927. Since 1934 he was president of the A. T. Still Osteopathic Foundation and Research Institute. He was a member of the National Board of Examiners for Osteopathic Physicians and Surgeons from the time of its organization and its secretary-treasurer from 1940 until the time of his death.

After serving as a member of the Board of Trustees of the American Osteopathic Association from 1930 to 1935, Dr. Rogers was elected First Vice President for 1935-36 and President for 1936-37.

For over 23 years Dr. Rogers was an indefatigable worker for organized osteopathy. During all of these years he maintained a close association with the educational aspects of the osteopathic profession and worked continually for higher educational standards in osteopathic colleges. He reiterated again and again that therein lay the basis for the very existence of osteopathy. From 1931 to 1938 Dr. Rogers was Chairman of the Bureau of Professional Education and Colleges. He was influential in increasing its membership and expanding its activities to their present scope.

In 1938 the Philadelphia College of Osteopathy awarded Dr. Rogers the honorary degree of LL.D. in recognition of his contributions to osteopathic education. He has been listed in Burke's Landed Gentry, Who's Who in America, Who's Who in Wisconsin, Who's Who in American Education, and was the author of many articles in osteopathic publications.

Dr. Rogers was a member of Delta Tau Delta, Phi Sigma Gamma, Sigma Sigma Phi, of which he was president in 1937, Osteopathic War Veterans Association, Masons (32nd Degree, Shriner, K.T.), Elks, Kiwanis, Oshkosh Power Boat Club (past commodore), Oshkosh Outboard Motor Club (past commodore), and many other civic and community organizations.

Surviving Dr. Rogers are his widow, the former Marjorie Stanley, and two children, Mrs. Jean Williams of Wellington, New Zealand, and Richard C. Rogers, an osteopathic physician practicing in Blackwell, Oklahoma.

Dr. Rogers gave of himself freely to his hobbies, to his profession, and to humanity. He was at all times a leader among men. E. H. McKenna, D.O.

SPECIAL ARTICLE

The Small-Nerve Motor System in Relation to the Osteopathic Lesion*

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The motor fibers in the ventral root which supply skeletal muscle are classified as "A" fibers, are myelinated, and have a relatively high rate of conduction. They vary in size from 1 to 20μ (microns, 1/1000 of a millimeter) with conduction rates from 5 to 120 meters per second. However, these fiber sizes are not evenly distributed. Instead, there are two main groups of fibers in the ventral root: one group varying in size from 12 to 20μ, the other from 2 to 8μ. The larger fibers are much more numerous, although in the lumbosacral region of the cat about 25 per cent of the ventral root is composed of fibers of the "small-nerve motor system."

It has been known for many years, of course, that when the large fibers conduct impulses they stimulate the muscle fibers which they innervate to contract. Until recently, however, there was very little information—and even less agreement—as to the function of the smaller fibers, although it was assumed that they played some role in influencing muscular contraction. As a result of recent studies on frogs and cats by Kuffler and his co-workers[1,2,3] in which single fibers of the small motor system and the muscle fibers which they innervate have been studied by means of electrical and mechanical recording, and earlier studies by others (reviewed in references 1 to 3), an insight into the functions of the small-nerve motor system is being gained.

These studies are of considerable interest to osteopathic physicians in that their results and implications appear to have an important bearing on osteopathic theory and practice. Certainly, promising approaches are offered to the solution of a number of key problems in osteopathic theory: (1) They may offer a clearer understanding of the manner in which irritable foci or facilitated segments of the spinal cord may result from structural and other disturbances. (2) A mechanism is provided which may account for the very enduring contractions or contractures which are associated with osteopathic lesions, and possibly for the sustaining mechanism. (3) One possible mechanism may be offered to account for the muscular relaxation which is induced by stretching the involved muscles. (4) These and earlier studies suggest a very reasonable basis for the "ropiness"—thin bands of tense muscle fibers—often found in lesioned areas.

In the past, the segmental disturbances set up by lesions, the sustained contractions, the relaxing effect of stretching and other soft-tissue technics, and ropiness have been taken for granted. Fortunately, however, it is beginning to be recognized that an understanding of their basis—perhaps a common basis—may open paths to new, unforeseen kinds of osteopathic diagnosis and therapy.

Since the results with the frog and cat were different, they will be reviewed separately. No attempt is made to review the experimental procedures and observations in detail, but only to summarize the results and conclusions. Readers are referred to the original articles.

THE FROG[1,2]

1. When a large motor fiber is given a single stimulus the muscle fibers it supplies respond with the familiar and easily visible twitch contraction, followed by a rapid and complete relaxation. Repetitive stimulation at high frequencies produces tetanus, a large sustained contraction, so long as the stimulus is maintained. Relaxation immediately follows withdrawal of the stimuli. On the other hand, when the small motor fibers to the same muscles of the frog were stimulated with a single shock, there was no visible response. Visible contractions were obtained only with repetitive stimulation (7 to 20 per second). These contractions were small as compared with the twitch and tetanus elicited with large-fiber stimulation, gradual in development, smooth and well sustained.

2. Responses to large-fiber stimulation involve the entire length of each fiber, whereas responses to small-fiber stimuli are limited to one or two small foci, apparently in the region of the myoneural junction.

3. Discontinuation of stimulation of the small fiber does not result in immediate relaxation of the muscle fibers. Sustained, relatively unfatiguable shortening remains for some time after cessation of stimulation. By definition, the sustained and localized shortening or tension, in the absence of stimulation, is designated "contracture."

4. The electrical responses are also relatively small, slow in development and regression, and limited to the myoneural junction, in contrast to the high-voltage, rapid, and propagated action potentials associated with large-fiber stimulation.

5. Small-nerve fibers of the ventral root divide and innervate numerous fibers in a muscle.

6. A given muscle fiber may be innervated by both small and large-diameter nerve fibers. There is doubt, however, that such dual innervation is widespread. In the ileofibularis muscle of the frog, for example, the small-fiber supply is concentrated in a bundle of muscle fibers ("tonus" bundle) which are frequently reddish and are otherwise different in appearance, structure, transparence, and viscosity from the rest of the muscle.

7. The small-nerve system can be activated reflexly, responding to afferent impulses reaching the spinal cord. It may be activated simultaneously with the large-nerve system, or it may reflexly maintain an appreciable tension while the large-fiber system is in-

*This article is based on a report given by the author during his Senior year at the Kirksville College of Osteopathy and Surgery, before the Seminar on Osteopathic Fundamentals. This Seminar, which has come to be known as the Coccyx Club, is under the direction of Irvin M. Korr, Ph.D., Head of the Department of Physiology. Acknowledgement is made to Dr. Korr for suggesting this study and for aid in preparation of the manuscript, and to the other members of the Seminar who participated in the discussion of the original report.

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active or only slightly active. The small-fiber system responds to a slighter afferent bombardment than is required for activation of the large-fiber system, but apparently they can both be reached through the same afferent pathways.

8. Reflex contractions mediated by the small-nerve fibers do not always terminate upon cessation of reflex stimulation. The tension may persist for several minutes. Long-sustained tensions may therefore be induced with relatively slight reflex stimulation of this system. The small-nerve system appears to be well suited for the maintenance of these relatively slow and weak graded muscle contractions and may therefore be of considerable importance in relation to postural mechanisms.

9. If the large-nerve fibers are briefly stimulated while the small-nerve system is reflexly occupied, an increase in sustained muscle tension is rapidly attained.

10. On the other hand, if the large-nerve fibers are similarly stimulated while the muscle is in the stage of contracture which persists after cessation of small-fiber stimulation, there is immediate "collapse" or release of that contracture.

11. Release of the contracture may also be brought about by brief passive stretch of the muscle.

12. The force of the small-fiber contraction is very sensitive to the amount of stretch or tension imposed on the muscle by its attachments, the largest contractions being produced in the relatively unstretched condition, whereas twitch contractions are maximal when the muscle is under slight tension, as in an extended extremity. That is, in the frog (*cf.* the cat, below) the small-nerve system is most effective in developing tension when the initial muscle tension is low.

13. Since the sustained muscular tensions induced through the small-fiber system are favored by concurrent action of the twitch (large-fiber) system and are wiped out by twitch action when small-fiber discharges have stopped, there is a strong suggestion of their "tonus" role in posture and movement. A possible relation to the postural red muscle fibers of the mammal is indicated.

THE CAT

Only a preliminary report[5] has appeared as yet, limited to the soleus and tenuissimus muscles of the cat, but the following points appear well established.

14. Stimulation of the small fibers to the above muscles of the cat caused no detectable muscle shortening and no propagated muscle impulses.

15. Such stimulation, however, caused an increased flow of impulses in the *sensory* (afferent) nerve fibers from the same muscle.

16. These impulses were shown to arise in the receptors known as muscle spindles.

17. The intensity of this afferent discharge from the receptors (in response to small-fiber stimulation) is extremely sensitive to stretch imposed on the muscle. A slight increase in tension applied to the muscle facilitates and exaggerates the afferent discharge of the muscle spindle. Lowering the muscle tension renders the muscle spindle less sensitive to small-nerve stimulation. More intense stimulation is then required in order to elicit comparable (afferent) activity from the spindle. At zero muscle tension, however, even prolonged stimulation of the small fibers may evoke no afferent impulses from the spindle; a slight tension may then cause streams of impulses to issue from the muscle spindles into the dorsal root fibers to the cord.

18. The facilitation mechanism of spindle discharge and other data suggest that the small-nerve fibers in the cat cause local contractions of intrafusal (spindle) muscle fibers. This contraction in turn activates the sensory (annulospiral) nerve endings or receptors associated with the spindle and causes them to send streams of impulses into the central nervous system.

DISCUSSION

It is impossible at this stage to determine the degree of relevance of these studies on the limb muscles of experimental animals to the paravertebral musculature of man, but it is of interest to speculate on their implications with respect to the mechanisms inherent in the osteopathic lesion.

Sustained localized contractions or contractures of paravertebral muscles are commonly, if not invariably, associated with structural or postural stresses, osteopathic lesions and reflex manifestations of visceral and other disturbances.[4, 5] These abnormal muscular tensions may not only be sources of pain and of irritation to other structures, but also play an important role in sustaining the lesion itself. The mechanisms behind these abnormal tensions, other than those passively imposed on the muscles by gross bony displacement, are as yet obscure. If Kuffler's observations on the frog have any pertinence in this connection (points 1-8, above) they may lead to a better understanding of these mechanisms. Certainly, in the limb muscles of the frog, it required relatively slight reflex excitation of the small-nerve system, (presumably from *any* source), to sustain a considerable amount of tension. It is of interest to recall in this connection[6, 7] that tense spinal muscles in lesioned segments may remain in this condition in the complete absence of (large-fiber) impulses.

Although it has been known for a great many years that passive stretching will, at least temporarily, relieve the tension of postural muscles, the manner in which this effect is produced has remained a mystery. The observation (point 11) that stretching of a muscle will release the contracture established by small-fiber stimulation is most suggestive.

On the basis of the investigations conducted in the Kirksville laboratories, it has been stated[5, 8] that there is associated with a spinal osteopathic lesion a facilitated segment of the spinal cord. Neurons originating in that segment are maintained in a hyperexcitable state, according to the hypothesis, by streams of afferent impulses entering the cord through the corresponding dorsal roots. Although indirect evidence from various sources supported the conjecture that the proprioceptors (stretch and tension receptors in muscles, tendons, ligaments, and periarticular structures)‡ were important sources of that afferent irritation, there has been no clear idea as to which receptors, nor as to the manner of their sustained stimulation. With the demonstration (point 17) of the extreme sensitivity of the small-fiber-muscle-spindle system in the cat to stretch, a clear approach to this problem is offered. In the presence of even slight supernormal muscular tensions, such as might be imposed by asymmetrical postural stresses, subluxations, et cetera, the streams of impulses from the muscle spindles into the corresponding segments of the spinal cord would be very greatly exaggerated. The mechanism for the continuance of the contraction and for nervous irrita-

‡An article on the sensory innervation of these structures and on the proprioceptors is in preparation by another member of the Seminar.

tion or inhibition of other structures innervated from that segment would be set up.

Further, it should be recalled that the intensity of the barrage of impulses from the muscle spindles is the resultant of two main factors, namely, imposed tension and activity of the small-motor fibers innervating the spindle (point 17). Since the reflex stimulation of the contractile elements (intrafusal fibers) in the spindle may come from other sources than the muscle itself, such as irritable foci in the skin, viscera, et cetera, a basis may be provided for trigger zones, secondary osteopathic lesions of reflex origin, the establishment of vicious circles and for the lasting effects of momentary interruption of the vicious circles.

Since there is considerable evidence that each muscle spindle, through its afferent connections in the spinal cord, reflexly influences the muscle fibers in its immediate vicinity, a hyperactive spindle might very well be the basis for each of the tense muscular strands which characterize the familiar "ropy" muscle, as suggested by Korr.[5] The hyperactivity of the spindle could be attributable to mechanically imposed tension, to reflex stimulation of the small-motor fibers to the spindle, or to both. In general, it is felt that more and more attention must be focused on the muscle spindle as a decisive factor in the physiology of the osteopathic lesion.

It must be emphasized that although the views expressed above may have considerable basis in fact and in reason, they have not been put forth as possible final answers but only as questions—as a working hypothesis for further investigation. Their final evaluation, and the fullest application of the important findings of Kuffler and others, can be accomplished only through a great deal more research.

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STUDENT SCREENING PROCEDURE

In the fall of 1948 approximately 500 osteopathic college freshmen were selected from slightly over 2000 applicants. In 1949, 505 freshmen were chosen from 2480 applicants. College admissions committees are doing everything possible to make sure that the applicants who are selected for osteopathic training have the qualifications which are thought necessary to become successful physicians and valuable members of the profession.

Many members of the osteopathic profession are officially engaged in assisting osteopathic colleges in the preliminary screening of students who have expressed an interest in the osteopathic school of medicine. These physicians are members of divisional society vocational guidance committees or student selection committees and many of them are working closely with the premedical faculty members of their local preprofessional colleges. Some of them are representing the profession by personal talks to their local high school groups about the profession, in which they stress the personal and academic qualifications which are considered necessary to become a successful osteopathic physician. Some physicians are working closely with the premedical committee in their local preprofessional college and are considered as unofficial members of the premedical committee. Preosteopathic students are referred to these physicians by the college faculty, and the doctors closely follow the preosteopathic students' progress.

Some physicians have been discouraged when students whom they have recommended to osteopathic colleges have not been chosen for admission. In every case these doctors have recommended students for admission who were not qualified, usually due to the lack of academic preparation or to the poor quality of academic work.

This article on student screening is expressly written for the many osteopathic physicians who are proudly discussing the profession with young men and women who they think should enter the profession.

All of the osteopathic college admissions committees are hopeful that they can depend upon the recommendations of an applicant sent in to them by osteopathic physicians in the field. A letter written by a physician regarding an applicant to the effect that he knows the applicant's parents and that they are fine people and that the student is a splendid boy or girl, as the case may be, does not give sufficient information about the applicant. College admissions committees, in asking physicians to interview preosteopathic students, are interested in the physician's estimate of the student's ability to become a doctor. The physician must have general information about the student's academic background. He should be able to size up the applicant's personal appearance and oral expression and to give an estimate of the applicant's qualities of leadership. The admissions committee expects the physician to determine how strongly the student is motivated toward the osteopathic school of medicine. When the physician replies that the applicant is excellent in all of these qualities, with no comments, the admissions committee is quite likely to ignore the recommendation, or to reply to the doctor requesting the reasons why the applicant has been rated as excellent in all of the necessary qualifications.

Admissions committees of osteopathic colleges expect that the physicians who are interviewing preosteopathic students will conscientiously and frankly give the college their actual opinions of the candidates.

In many cases the osteopathic physician, who has been asked to give an opinion of an applicant's fitness to enter the osteopathic profession, has known the applicant for some time and should be able to judge his qualifications. In other cases the physician interviews the candidate for the first time, and during the interview he must determine whether or not the candidate may meet the personal and academic standards required by osteopathic colleges.

In conducting such an interview it is essential that the physician establish friendly relations with the candidate in order to obtain accurate and reliable information. The student

has completed years of hard work, planning, and possibly sacrificing, and his interview with you, which is required by the osteopathic college, is the culmination of his purpose. Therefore, it should not be surprising that the applicant may appear to be under a strain. Do everything possible to help him relax and put him at ease.

In conducting the interview with a prospective osteopathic student the interviewing physician should keep several factors in mind. He must determine, as far as possible in a comparatively short interview, whether the student impresses him as possessing the necessary qualities of a physician. He must try to discover what factors have influenced the student to wish to become a physician, and especially an osteopathic physician. The physician should realize that the admissions committee desires him to be specific regarding the candidate's attainment, capacity, purposes, interests, and possible defects of health or personalilty not available in the usual record supplied by the preprofessional colleges.

During the interview the physician should determine to his own satisfaction how the student stands in regard to the factors listed on the following Interview Rating Sheet. Upon the completion of the interview the physician should grade these factors to the best of his ability.

INTERVIEW RATING SHEET
FOR APPLICANT
TO A COLLEGE OF OSTEOPATHY AND SURGERY

Name of Student..... Age.....
Address .....
(Street) (City) (State)
Preprofessional College .....
Applying to.....
(Osteopathic College)

	Excellent	Good	Fair	Poor
1. Aptitude for career of physician.....				
2. Motivation toward the osteopathic school of medicine.....				
3. Emotional stability.....				
4. Qualities of leadership.....				
5. Military service.....				
6. Personal appearance.....				
7. Oral expression.....				
8. Physical condition.....				

9. As a patient would you choose the applicant as your doctor ten years from now?
Yes..... Doubtful..... No.....
10. Remarks:
Date of Report.....
Signed .....
Address .....
.....

Each of the factors listed on the Interview Rating Sheet is considered important by all osteopathic college admissions committees and they are discussed in this article.

Factors 1 and 2—Aptitude for the Career of Physician; Motivation Towards the Osteopathic School of Medicine.—Since all of the osteopathic curriculum centers around the application of science and scientific principles, the over-all interest in osteopathy can be measured to a large degree by the applicant's specific interest in science. The applicant should be asked which subjects he enjoyed the most in high school and college. Those sciences which emphasize performance would include chemistry, biology, and physics. A student, who confesses that he had difficulty with these basic sciences, should never be encouraged to continue with his hopes of becoming a physician. Although osteopathic colleges are not stressing the importance of "A" grades, or even "B" grades, as a requirement, the student should have done above-average work in the basic sciences if he is to be successful in the first 2 years of the osteopathic course. The physician should be wary, therefore, of the student who has had a poor scholastic record. Such students always have excellent excuses for their records.

The interviewing physician can readily determine from the student's conversation whether or not his desire to become a physician is a deep one. Many applicants will say, "I have always wanted to be a doctor," or "I have always wanted to study medicine," or "Since early high school I have been thinking about becoming a doctor." Others may say, "I want to be a doctor so that I can be of service to humanity." This last reply will most often come from the more idealistic students. The combination of the two types of replies is ideal.

Possibly the applicant is a son or daughter of a physician and thinks highly of his parent's profession. In this case there can be little question about the motivation of the student. The interviewing physician, however, must be cautioned at this point. There may be cases when the professional parent has practically driven the student into his profession. Some of these individuals turn out to be unfortunate misfits.

Osteopathic motivation is a factor, which is greatly emphasized by osteopathic colleges in considering an applicant. Usually the applicant or members of his family have come in contact with osteopathy. If the student in any way indicates that he is applying to an allopathic medical college, or that he thinks that his qualifications are not good enough for entrance into an allopathic medical college, discourage him immediately. He will not be favorably considered by the college admissions committee.

Sincere interest in osteopathy presupposes a high degree of interest in people. This interest may be revealed in the various activities in which the applicant has been engaged, such as jobs which require working with people and school organizations and recreational activities participated in.

Factor 3—Emotional Stability.—By emotional stability is meant the possession of calm control and the ability to meet trying situations with a minimum of worry and frustration. During the interview is the applicant unduly ill at ease, nervous? Does he bite his nails, tug at his tie, scratch his head frequently, or is he able to follow the conversation without becoming excited? Does he skip from subject to subject in an unorganized manner? If the student were of high school age, such weaknesses would be understandable, but at the age of 20 or more, they may indicate that he has not matured emotionally.

Factors 4 and 5—Qualities of Leadership; Military Service.—A good applicant should have the capacity to direct, control, and influence others in definite lines of action or movement. What has he organized? Of what has he been in charge? Perhaps he was captain of the high school or college athletic team. He or she may have been president of some college group or organization. Does the applicant have a World War II service record? Did he win his stripes or get a commission? Did he organize any activities while in service?

From the very beginning of its history the osteopathic profession has been blessed with a high percentage of men and women with unusual leadership ability. This, more than any other factor, accounts for the growing recognition of the osteopathic school of medicine by the lay public and by legislation at the state and national level.

At present capacity, the six osteopathic colleges can graduate from 400 to 425 doctors a year. The attrition rate now in the osteopathic profession has reached about 150 per year, due to either retirement or death. Therefore, with present training facilities the osteopathic profession can expect to increase in the future at the rate of from 200 to 250 doctors per year. To insure the future of the profession, it is absolutely essential to consider leadership as an important requirement in the admission programs of the six osteopathic colleges.

Be wary of the "bookworm type" or the "lone wolf type." If a student at the age of 20 or more has not yet learned to work with people, in all probability he will not be a successful physician or a leader in his profession.

Factor 6—Personal Appearance.—How does the student's manner and appearance affect the interviewing physician? Is he neat in his dress? Does he show signs of being meticulously clean? If a student appears before the interviewing physician in slovenly dress, in need of a shave, and with begrimed fingernails, unclean teeth, and unkempt hair, most of the interview can be passed over and it can be terminated rapidly. Habits of physical cleanliness and neatness are usually formed by the time a man reaches the age of 20 or 21.

Factor 7—Oral Expression.—By oral expression is meant the ability to convey thought to others in an understandable manner. Is the applicant's language slovenly? Is his use of English poor? Does the applicant possess any speech defects which you feel would handicap him as a physician? It requires unusual ability and personality on the part of a man who has to overcome a speech defect to be successful in any profession. Nothing detracts more from a doctor, who, if successful, is respected by all people as a professional man, than the use of careless language and exceptionally poor English. A large part of a physician's effectiveness is due to the faith in himself, which he builds in the mind of the patient.

Factor 8—Physical Condition.—More than 99 per cent of the applicants to osteopathic colleges will have no serious physical defects. However, all disabilities, including ill health, defects of vision, hearing, or speech, loss of an arm, and paralysis of any part of the body, must be carefully considered before a recommendation can be made. Such defects must be considered serious physical handicaps in the career of an osteopathic physician. True, there are exceptions, but an applicant with any marked disability must be very unusual to be recommended for the study of osteopathy. The interviewing physician should list the disability on the rating sheet and state under the section for remarks whether, in his opinion, the applicant could overcome the handicap.

Factor 9—As a Patient Would You Choose the Applicant As Your Doctor Ten Years From Now? This may appear to be an unfair question for the interviewing physician to ask himself. It is granted that the physician has no way of knowing whether the applicant will be successful in his training or not. However, taking into account the impossibility of knowing the outcome of training, consideration of all the above factors should form a picture in the mind of the interviewing physician which will make him able to answer this question without hesitation. If he is doubtful or if his answer is "no," he should state why on the rating sheet.

The Interview Rating Sheet is provided the physician either by the osteopathic college which is requesting the interview or by the Office of Education of the American Osteopathic Association. The physician is asked to grade the applicant "excellent," "good," "fair," or "poor" on each of the items discussed. For example, if the physician believes that the applicant's motivation toward the osteopathic school of medicine is exceptional, the physician should place a cross in the column "excellent." The physician may be taxed in judging the applicant as being "excellent," "good," "fair," or "poor" on each of the eight items in the rating sheet. In general the applicant must be very exceptional to be judged as "excellent" on each of the items. If the physician finds after grading the applicant on all of the items that the overall rating is "good," he may be sure that the applicant is above average.

As soon as the interview is over, the meeting should end in a pleasant manner. Do not give false encouragement to an applicant whom you feel you can not wholeheartedly recommend. A skillful interview should not require more than 30 or 40 minutes. The interviewing physician is rendering a valuable service to his profession and to his professional colleges. A frank statement that the applicant's chance for admission is doubtful makes for better public relations than false encouragement. A skillful interview, whether conducted by the individual physician or a college admissions committee, makes a valuable contribution to the over-all public relations program of the profession. The applicant should leave the interviewer with the attitude that whether he is accepted or rejected, the integrity and professionalism of osteopathic education are above reproach.

The primary goal in the work of the osteopathic physician actively engaged in student selection is to encourage young men and women whom he believes to have even better qualifications than his own to enter and carry on the osteopathic profession.

Department of Public Affairs

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EXEMPTION OR IMMUNITY OF CHARITABLE ORGANIZATIONS FROM LIABILITY FOR NEGLIGENCE

A recent case decided by the Supreme Court of Vermont is further evidence of a trend in the law to refuse to exempt from liability for negligence, religious, educational, and charitable institutions. In the state of Vermont, the liability of private charities for injuries due to negligence had never been decided by any court nor was there any statute regulating or creating specific legislation upon the problem. It was conceded in this case that the question was one that was undecided by either case law or statutes. The case in instance was one in which a plaintiff, Mary Foster, sought to recover damages from the defendant, the Roman Catholic Diocese of Vermont, resulting from a fall on ice in December, 1947. The plaintiff alleged that the defendant owned a church building and premises in the city of Rutland, Vermont, known as St. Peter's Church. The plaintiff complained that the defendant had negligently maintained a cement driveway with a cement gutter leading into it from the premises across a public sidewalk to a public street and that ice accumulated in lumps and irregular ridges to a considerable depth on the sidewalk resulting in an injury to the plaintiff when she slipped and fell because of this dangerous situation.

While the question of the liability of a church might not at first blush appear of interest to physicians and surgeons, it should be recognized that the rule of law expounded by the court in this instance would also apply to charitable hospitals in the state as well. Since the case furthermore indicates an extension of the legal trend toward holding charitable institutions liable for negligent acts, the case will be of interest to all persons affiliated with a hospital. The court decided the case upon the broad question of: "Is or is not a privately conducted charitable institution liable for injuries caused by negligence."

The court immediately recognized that the issue was one which had been the subject of conflicting decisions in other jurisdictions. The court said:

> The question presented is one of great interest and much has been written about it in recent years. It is one upon which there has been and is not only much conflict of decisions among the courts and among the members of the various courts, for many decisions have been far from unanimous, but there is great diversity of opinion among courts that reach the same ultimate decision, as to the correct reason, or ground for so deciding. Every reason advanced and ground used has been vulnerable to attack and criticism and there has been no lack of it. When we look to decisions in other jurisdictions for enlightenment we are confronted with an irreconcilable conflict of reasoning and result.

The various cases which have resulted in appellate court decisions in other jurisdictions relating to the liability of charitable organizations have arisen in what may be classified as three different groups:

> . . . 1st, The nonliability cases, that is, those that deny any liability whatever. 2nd, The total liability cases, that is, those that apply the regular negligence rules. 3rd, The partial liability cases, that is, those that grant liability for the benefit of certain classes of plaintiffs but not for others or against the defendant for negligence in some ways but not in others. It may be said generally that the weight of authority numerically as to jurisdictions between the nonliability and total liability doctrine lies with the nonliability jurisdictions. The trend of the more recent cases, however, is towards total liability. As between the nonliability jurisdictions and the partial liability ones, the weight of authority lies with the partial liability jurisdictions.

The court first discussed the group of cases which have been decided on the basis of the so-called "trust fund" theory. In regard to these, the court said:

The nonliability cases are generally founded on what is called the "trust fund" theory. This is based upon the reasoning that the assets of the institution created by the founders thereof constitute a trust for particular charitable purposes and if it should be diverted to the payment of judgments that might be obtained in suits against the institution, the purpose of the charity as well as that of its donors would be frustrated and the charity perhaps destroyed. This theory was first introduced in an 1848 English case of Heriot's Hospital v. Ross, 12 C. & F. 507. Its essence seems to be that the preservation of the charitable trust funds is more desirable than the right to compensation from the funds for an injury inflicted by the operation of the charity. It was repudiated in England in 1866 in the case of Mersey Docks v. Gibbs, 11 H.L. 686. Both England and Canada now hold a charity to the universal standard of care. Hillyer v. St. Bartholomew Hospital, 2 K.B. 820 (1909); Donaldson v. General Public Hospital, 30 N.B. 279, (1890); Lavere v. Smith's Falls Hospital, 35 Ont. L. Rep. 98.

The soundness of the theory and its justice was put to a test when cases came before the courts that involved the question of whether or not a charity was liable whose agent or servant, in carrying out its objects, negligently inflicts injury to an entire stranger to the transaction. It was at once apparent that no principle was sound or just that would absolve a charitable institution from liability in running down a pedestrian on the highway The general criticism was expressed by the Court in Putnam Memorial Hospital v. Allen, 2 Cir., 34 F. 2d 927, 929, a case that arose in this state that involved a hospital ambulance colliding with an automobile driven by the injured plaintiff, wherein the court, in the absence of a decision in this state on the question stated: "To hold that a charitable institution, whose agent negligently runs down a pedestrian upon the street, need not respond in damages, although the circumstances are such as would render any other defendant liable, seems to us a monstrous doctrine. It is true that several courts of high authority have gone to this extreme (citing cases), but in our opinion no adequate reason has been, or can be, advanced for allowing the purpose of the settlor of trust funds to introduce into the law a principle which, to us, appears so anomalous and so unjust. We prefer the reasoning of cases which have applied the ordinary rules of liability to such a situation as is now before the court.

One of the strongest arguments in regard to the exemption of charitable institutions from liability has been that public policy dictates that such institutions be free from the worry or inroads of verdicts resulting in a depletion of their assets. In regard to this, the court said:

The defendant urges that public policy dictates that charitable institutions shall be exempt from liability for negligent injury. Some courts have decided in favor of nonliability on that ground. It is nearly analogous to the trust fund doctrine. Its essence is that suits for injury would cause a depletion of the funds of the charity, thereby depriving the public of its benefit and that the rights of the individual who is injured to redress should be subservient to the interest of the general public in the preservation of the institution; that it is better that one rather than many suffer; that the advantages to the public outweigh the detriment to the individual who has been injured. There is no sufficient reason under a sound public policy requiring this court to say that an individual be deprived of his right to recovery from such an institution because its funds are derived from a charitably minded public. The enforcement of the individual's rights to recover will not deprive the public of the benefits of the institution. That has been shown to be true in those jurisdictions where liability is the law. A charity should not be permitted to inflict injury upon one without redress in order that it may do charity to others. The result would compel the injured person to contribute to the charity against his will. If such persons were seriously injured or incapacitated for life, it might result in the charity that caused the injury being freed from responsibility and the burden for the care and support of the injured person falling upon some other charity or even upon the very public supporting the negligent institution. The financial burden could very easily be shifted from the responsible charity to an innocent one in no way connected with the injury. The public is concerned with the way these institutions are managed if they are to be of the most service to mankind. It is of vital importance that they be properly managed and controlled. If they are relieved from negligence it gives them an opportunity to be careless without redress and puts a premium on the neglect of duty. Men are not necessarily careful and there should be no failure to exercise ordinary care. Neglect of duty should be prevented, not encouraged.

Private charities are much different now than when the liability question was first before the courts. Then they were largely small institutions, many connected with churches, and of limited means. Today they have become, in many instances, big businesses, handling large funds, managing and owning large properties and set up by large trusts or foundations. It is idle to argue that donations for them will dry up if the charity is held to respond for its torts the same as other institutions or that the donors are giving the funds or setting up large foundations for charitable purposes with the expectation that the charities they benefit will not be responsible like other institutions for negligent injury. Such charities enjoy endowments and resources beyond anything thought of when the matter of immunity was first considered.

In concluding its decisions, the court therefore made a clear-cut ruling regarding the liability of charitable institutions when it stated: "The fact that this defendant is a privately conducted religious and charitable institution does not entitle it to any exemption or immunity from liability for injury caused by negligence."

Foster v. Roman Catholic Diocese of Vermont (Supreme Court of Vermont, 1950) 70 A. 2d 230.

Department of Public Relations

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BILLS IN CONGRESS

HR. 857; HR. 4238; HR. 4349; HR. 4871; HR. 4947—Relate to vivisection in the District of Columbia, pro and con.

HR. 3001—To authorize admission into the United States of certain aliens possessing special skills. Includes persons seeking entry whose services are urgently needed in the United States because of highly skilled technical, medical, professional, or scientific training, experience, or ability, such services being prospectively beneficial to the United States. Passed House February 3, 1950.

HR. 6566—Mr. Sikes of Florida. Amends Federal Property and Administrative Services Act of 1949 to authorize donations of certain surplus property for public health purposes.

HR. 6630—Mr. Perkins of Kentucky. Increases period of education or training to which veterans of World War II are entitled.

HR. 6727—Mr. Keating of New York. Provides for deduction and credit of contributions or subscription charges to certain prepayment health service plans for the purposes of Federal income tax.

HR. 6766—Mrs. Bosone of Utah. National Health Insurance Act. Any person who is qualified under applicable State standards or requirements, or in their absence, under standards prescribed by the Federal Security Administrator, to furnish a type of medical or dental service, may apply to his State health board for certification as a participant. If the board determines that the applicant is qualified under this Act and under any regulations issued by the Administrator and if the applicant agrees to comply with this Act and with any regulations issued thereunder, the board shall certify the applicant as a participant entitled to receive compensation under this Act for furnishing personal health services to eligible individuals. Establishes in each State a state health board to be composed of fifteen members. Members of each State health board shall be appointed by the State medical society having the largest membership in the State. Six members shall be qualified to practice medicine in the State; three members shall be qualified to practice dentistry in the State; two members shall be registered in the State as professional nurses or qualified as practical nurses; two members shall be supervisors of hospitals in the State; two members shall be practicing pharmacists.

HR. 6819—Mr. Keating of New York. Revision of HR. 6727.

HR. 6826—Mr. Vinson of Georgia. Extends the Selective Service Act for a period of 3 years.

HR. 6981—Mr. Lane of Massachusetts. Local Public Health Units Act of 1949.

HR. 6982—Mr. O'Konski of Wisconsin. Authorizes grants and loans to cooperatives and nonprofit associations operating medical and hospital-care plans, for the acquisition, construction, and equipment of needed facilities.

HR. 7235—Mr. Elliott of Alabama. Extends the period for initiating a course leading to a degree of doctor of medi-

cine or doctor of dental surgery under the G. I. Bill of Rights.

S. 1703; S. 2003; S. 2033—Relate to vivisection in the District of Columbia.

S. 2833—Mr. King of Washington. Reorganizes the Department of Interior. Transfers Bureau of Indian Affairs to Federal Security Agency.

S. 2915—Mr. Pepper of Florida. To exempt admissions to activities of educational institutions from the tax on admissions.

S. 2940—Mr. Hunt of Wyoming. National Health Act of 1950. Establishes a Department of Health, with cabinet status, the Secretary of Health to be a professional health worker, who has been active in the practice of medicine or dentistry but has not held office of any nature in a political party organization. Would make available voluntary prepaid health insurance to families whose gross income is not more than $5,000. Includes a $5.00 deductible feature.

S. 2978—Mr. Langer of North Dakota. To make available medical and hospital treatment to certain individuals who have had a minimum of 10 years' service as civil officers or employees of the Federal government.

OSTEOPATHIC COLLEGES INCLUDED IN ATOMIC TEACHER TRAINING PROGRAM

A series of one-week "teacher training" courses in the medical hazards of atomic warfare for selected physicians, private and State and local government, and members of the faculties of accredited medical and osteopathic colleges will be conducted under the sponsorship of the Atomic Energy Commission at seven universities beginning the latter part of March.

The National Security Resources Board, the government agency responsible for civil defense planning, assigned to the AEC the task of setting up the training courses in the treatment of radiological injuries among civilians as part of the program for wartime disaster relief planning.

Early in February, NSRB transmitted to the Governors of the States a Civil Defense Planning Advisory Bulletin requesting the Governors to nominate candidates for the courses, and suggesting as a category of source criteria: "A qualified teacher from each osteopathic college within the States approved by the American Osteopathic Association."

Chief emphasis is on the training of medical and osteopathic school personnel because these schools represent an ideal place for dissemination of information, on atomic warfare, to both graduate physicians and students.

The courses will be held in the Argonne National Laboratory, Chicago, Illinois; the Atomic Energy Project, University of Rochester, Rochester, New York; and Western Reserve University School of Medicine, Cleveland, Ohio. Later in the spring, courses will be offered at the Atomic Energy Project, University of California at Los Angeles, California; the University of Utah School of Medicine, Salt Lake City, Utah; the University of Alabama School of Medicine, Birmingham, Alabama; and Johns Hopkins School of Medicine, Baltimore, Maryland.

MARRIAGES AND DIVORCES CONTINUE TO DECLINE

Only four States reported a larger number of marriages in 1948 than in 1947, and only one State a larger number of divorces, according to provisional figures reported to Federal Security Administrator Oscar R. Ewing by Surgeon General Leonard A. Scheele of the Public Health Service. It was pointed out, also, that these increases were quite small and were far outweighed by the declines in the other States. Over the country as a whole marriages and divorces in 1948 declined for the second successive year since 1946.

There were 1,802,895 marriages in the United States in 1948. This was a decrease of close to one-tenth from the figure for 1947 and more than one-fifth from 1946, the only year in this country's history when the number of marriages exceeded 2 millions. The marriage rate dropped from 16.4 per 1,000 population in 1946, to 13.9 per 1,000 in 1947, and to 12.3 in 1948.

In the same years, divorces dropped even more sharply than marriages. It was estimated that 405,000 divorces were granted in the United States in 1948. This estimate was about one-eighth below the 1947 estimate and one-third less than the 1946 peak, when divorces were estimated to have exceeded one-half million, the largest number of divorces for any year on record. Divorce rates dropped from 4.3 per 1,000 population in 1946, to 3.4 in 1947, and to 2.8 in 1948.

Current Medical Literature

EQUALIZATION OF LEG LENGTHS

William T. Green, M.D., in an editorial in *Surgery, Gynecology, and Obstetrics,* January, 1950, points out that although anterior poliomyelitis in the growing child most commonly causes shortening of a leg, the discrepancy in lengths, either from shortening or overgrowth, may happen because of congenital anomaly, epiphyseal wounds, congenital hypertrophy, vascular abnormality such as arteriovenous aneurysm, neurofibromatosis, overgrowth after a fractured long-bone shaft, or even without any apparent cause. Discrepancy up to three-fourths of an inch can be compensated by a heel lift in the shoe, but a greater discrepancy should be adjusted, at least in part.

Leg-lengthening was achieved as early as 1905 by Codivilla. Abbott's technic, for the older child or young adult with paralysis in the lower leg, was in vogue after 1927 for some years. The convalescence is long and complications such as nonunion limit its use, these days, to special cases.

It would seem more rational to operate upon an abnormal short leg than upon a normal long leg. However, in adults, shortening a long bone is now used frequently, since it is simpler, requires a shorter convalescence, and is relatively free from complication; if complication ensues, it is more likely to be a truly serious one.

In the child, modification of growth by inhibiting surgically specific epiphyses, for example, by Phemister's procedure, has gradually been perfected through the prediction of the effect of the arrest of particular epiphyses at any particular age and of the amount of growth for which each epiphysis is responsible. For this purpose estimations of relative skeletal age and maturity are necessary as a guide to clinical interpretation. The epiphyses involved are the lower femoral and upper tibial and fibular. Undercorrection is preferable to overcorrection. The epiphysiodesis can be performed in accordance with one of the various good prediction charts, such as that of Green and Anderson, which is simple and practical, with tibial and fibular arrest, followed by observation of the results, and the femoral arrest completed at a later date.

Technical exactness is required. There have been cases when overcorrection indicated the performance of an arrest on the short side to maintain the desired balance. Secondary surgery is sometimes necessary to correct imperfect technical factors.

Blount and Clarke have inserted staples across the epiphyseal plate which inhibit growth for the time they are left in the plate. After removal growth is presumed to continue. If prediction charts are used to time the procedure, it is possible that untoward results may be avoided. This method is still in experimental stages.

STELLATE GANGLION BLOCK IN THE TREATMENT OF ACUTE CEREBRAL THROMBOSIS AND EMBOLISM

Recent reports have indicated that a block of the stellate ganglion ipsilateral to the intracerebral lesion will bring the most effective improvement thus far noted in the treatment of acute cerebral thrombosis and embolism. Edwin W. Amyes, M. D., and Seymour M. Perry, M. D., treated a series of 44 patients differing widely in age, type of lesion, and duration of symptoms. The emphasis in their report in *The Journal of the American Medical Association* for January 7, 1950, lies

on the clinical improvement observed within 15 minutes to half an hour after the block. As the patients for the study were selected, spontaneous change for the better was utterly improbable.

The 28 patients who showed improvement exhibited increased motor power and better speech. During several days' observation these patients were more alert and better behaved, being able to feed themselves and attend properly to their excreta, and showing better spirits. The time interval between onset of the lesion and the treatment by stellate block influenced the outcome, as well as the type of lesion, but the study does not cover enough cases to supply any satisfactory statistics in regard to etiology. Good movement could be obtained if a limb were only weak. If paralysis were complete, painful stimulation was necessary to produce mass movement. Flaccid paralysis at no time changed to spastic paralysis. Some patients with complete motor or sensory aphasia improved enough to use jargon; if the affection were motor aphasia sometimes comprehensible speech was achieved.

In each patient the lesion was localized as a result of a detailed neurologic examination. The possibility of intracerebral hemorrhage was tested by lumbar puncture and by other methods. Dosage for the infiltration was 10 cc. of 2 per cent procaine hydrochloride. The injection was considered successful if Horner's syndrome followed within 1 to 20 minutes. Conscious patients received a preliminary intramuscular injection of 0.13 gm. phenobarbital sodium to offset a possible convulsion resulting from the stimulating effect of the infiltrate. A longer-acting local anesthetic may produce a better result, but this remains to be attempted.

When the signs of paralysis of the cervical sympathetic chain disappeared after the first stellate block, a 4-hour interval was allowed, and the procedure was repeated on the side opposite the lesion. The literature contains reports of deaths presumably resulting from simultaneous block on both sides.

Amyes and Perry say "the good results in the group far outweighed the trouble or risk involved. The changes noted and held during the period of observation were great enough to justify making stellate block routine treatment by well trained persons for acute cerebral thrombosis or embolism."

VALUE OF SOUTHEY-LEECH TUBES IN RAPID RELIEF OF MASSIVE EDEMA

A mechanical method for the rapid reduction of soft tissue edema which has been very much neglected in this country is recalled to attention by M. J. Fiese, M.D., and J. M. Thayer, M.D., in the *Archives of Internal Medicine*, January, 1950. An improvement by Leech on the Southey tube is the most efficient instrument for this purpose.

The patient is allowed to sleep all night seated in a comfortable easy chair with adequate sedation and plenty of pillows. In the morning the pressure in the tissues is maximal. A site on the medial or lateral aspect of the lower portion of the leg or ankle is usually chosen though the thighs or scrotum may be used in special circumstances. Cleansing with alcohol is followed with an antiseptic solution and the skin is anesthetized with a drop or two of procaine hydrochloride. The Southey-Leech tube, which has been previously autoclaved, is mounted on the trocar and thrust into the soft tissues. The cannula is held firmly with a clamp, the trocar is withdrawn, and the rubber tubing is attached to drain the fluid into a basin. Two or more tubes are used in each leg and are removed after 8 hours. The procedure may be repeated several times at intervals of a day or two and penicillin is used prophylactically against infection.

As much as 22 liters of fluid has been removed in a single 10-hour period and the weight has decreased as much as 27.3 kg. in 24 hours. The drainage has contained as much as 134 gm. of salt in a single day. Sometimes diuresis is initiated in cases where digitalis and mercurial diuretics may previously have been of no avail. Hydrothorax and ascites decrease without thoracentesis or paracentesis.

The indication for the use of Southey-Leech tubes is the presence of massive, soft, pitting edema of any cause which has failed to respond adequately to the usual therapeutic measures. They are also useful where rapid relief of edema is desired to supplement and potentiate ordinary therapy. Their use is contraindicated in infected, hard or brawny edema where they will be ineffective.

MORTON TERRY, B.A., D.O.

BULBAR POLIOMYELITIS

Believing that anoxia and carbon dioxide accumulation which occur in the presence of impairment of the swallowing mechanism which results in a damming in the airway of secretion, food, fluids, and vomitus are the factors responsible for the symptoms of the disease, Thomas C. Galloway, M.D., and Martin H. Seifert, M.D., in the September 3, 1949, issue of the *Journal of the American Medical Association*, present favorable results in 15 successive cases of bulbar poliomyelitis treated as a problem in respiratory obstruction.

Symptoms common to anoxia and bulbar poliomyelitis are dyspnea, restlessness, mental depression, disorientation, coma, increased blood pressure and subsequent fall, vasomotor failure, and circulatory collapse. Morphologic changes in the brain may result from 60 seconds of anoxia, damage or destruction of the brain cells or death from 3 to 8 minutes of anoxia. Previous damage to the brain by anoxia leaves the cells particularly sensitive to further inroads. Nonreversible changes may leave the patient with mental and emotional change, imbecility, insanity, or in an athetoid, parkinsonian or even decerebrate state, should he survive.

"The best evidence for the importance of anoxia (in bulbar poliomyelitis)," write Galloway and Seifert, "is that the symptoms are usually so promptly relieved when the airway is cleared."

Treatment includes the use of oxygen, postural drainage and aspiration, parenteral administration of fluids and nutrition, tracheotomy to by-pass secretion and to aspirate more easily, and the use of the respirator when the airway has been cleared.

Indications for tracheotomy are progressive anoxia with secretion in the upper airway, unconsciousness or pronounced restlessness in a patient who does not respond to other treatment in a few minutes, pronounced restlessness or stupor in a patient in a respirator, even if the paralysis is apparently of a spinal type, fluid accumulation not otherwise certainly taken care of in a patient who requires a respirator, bilateral paralysis or spasm of vocal chords, rapidly progressive bulbar symptoms, grave signs of vasomotor failure, or untrained or inefficient attendants, inadequate equipment or poor cooperation of the patient, with doubt that the airway will be kept constantly free of secretions.

The authors believe that their good results should not be exceptional. This treatment, which they describe in detail, has been used for other conditions with the same symptoms of respiratory difficulty and obstructing secretions, namely, in a case of severe tetanus (with curarization) and a case of a presumed myasthenia gravis (with neostygmine). They recommend that the poliomyelitis team should include a physician thoroughly trained to recognize and treat respiratory obstruction.

ANTIMICROBIAL THERAPY IN TYPHOID

Polymixin B (Aerosporin), aureomycin, and chloramphenicol (Chloromycetin) were investigated as to their antimicrobial effectiveness in the therapy of typhoid by Vernon Knight, M.D., and others and the results reported in the *Archives of Internal Medicine*, January, 1950.

Polymixin B was administered in doses of 200 to 500 mg. a day to four acutely ill patients. There was no evidence that the intramuscular administration of the drug exerted any influence on the course of the typhoid. Drug toxicity was manifested by perioral paresthesias and sustained hypotension, which in one case was followed by death.

Thirty-four patients with typhoid received aureomycin by the oral route in varying doses by mouth. Two patients died of intestinal complications and the remaining 32 patients recovered with none of the familiar complications of typhoid. Rapid recovery (disappearance of fever and symptoms in 72

hours) was observed in 4 patients; gradual recovery (during a week) occurred in 10 patients; and the course of the infection was unchanged during aureomycin therapy in 18 patients. Dosage varied from 47 to 500 mg. per kilogram of body weight and it was felt that higher doses were more effective but recovery even in these cases was not uniform.

Chloramphenicol (Chloromycetin) was administered by mouth in 5 or 6 divided doses each day. In general 100 mg. per kilogram was given daily for the first 2 to 3 days and 50 mg. per kilogram thereafter for a total of 7 to 10 days. All 13 patients were seriously and acutely ill but all had an abrupt recovery during the third day of treatment which resembled the crisis of pneumococcic pneumonia. No toxic effects were observed and no complications followed.

The conclusion then is that Chloromycetin is by far the drug of choice in typhoid and, presumably, in the other Salmonella infections.

MORTON TERRY, B.A., D.O.

PYOGENIC ARTHRITIS WITH PATHOLOGIC DISLOCATION OF THE HIP IN INFANTS

Prompted by his observations that a time lag in diagnosis of hip infection secondary to otitis media or sinusitis resulted in hip dislocation in infants and that the residual changes in the hip joint were different from those seen in children with sepsis of the hips, Jesse T. Nicholson, M.D., reports a study of 10 patients treated for pyogenic arthritis with pathologic luxation of one or both hips before they were 18 months old. The report appears in the *Journal of the American Medical Association*, November 19, 1949.

The luxation, manifest in limited abduction of the leg involved, developed because of pronounced effusion within the hip capsule. The usual treatment after the dislocation was reduced was immobilization in abduction and extension with a double plaster of paris spica. If the hip dislocation was not discovered until late or when the matter aspirated was thick, the hip was treated by drainage. These cases were not complicated by ankylosis or by recurrence of the infection.

Four subjects were followed 17 years, one 28 years. Function of the hip was normal and the patients free of symptoms. X-ray observations through these years showed residual change of the femoral head and neck. If there had been circulatory necrosis, revascularization followed. If the femoral neck could be held firmly in the acetabulum, the hip was stable, but luxation did not favor development of the acetabulum.

A treatment was devised when loss of the ossification center of the femoral head was observed. First a non-weight-bearing caliper brace was used, after which osteotomy to turn the head of the femur thus securing greater range of motion and a more nearly stable hip was performed. The resulting difference in leg length was 1¼ to 1½ inches.

THE EFFICACY AND THE SAFETY OF THE INTRAMUSCULAR ADMINISTRATION OF BACITRACIN IN VARIOUS TYPES OF SURGICAL AND CERTAIN MEDICAL INFECTIONS

Analyzing 270 cases and presenting brief outlines of some of these successfully treated, Frank L. Meleney, M. D., and others, report their findings in *Surgery, Gynecology and Obstetrics*, December, 1949.

The study was conducted over 22 months in six different places, using carefully standardized criteria, and the data then summarized at a central office. One group, three-fifths of the whole, consisted of those unsuccessfully treated with other antibiotics, 55.6 per cent of whom improved under bacitracin therapy. Of the other two-fifths, previously untreated, 78.1 per cent reacted well. The latter patients were ill a much shorter period, which the authors feel accounts for the difference in percentage. Bacteria responsible for the conditions usually were mixed, but bacitracin apparently is effective against a wide spectrum of invading bacteria. No inactivating substance produced by the human body has been found nor do the organisms become immune to the antibiotic, as so far observed.

The method of manufacture of the antibiotic put the experiment through three phases; one, when bacitracin was produced by a surface-growth method, and effects were good and there were few and unimportant toxic effects in the kidney; the second, when it was produced in deep tanks and some impurity caused the appearance of nephrotoxicity, and the third, when the deep-tank method was improved and the antibiotic met the former standard of efficacy and a new standard of safety.

A COMPARISON BETWEEN VARIOUS FORMS OF PSYCHOSURGERY

Fred A. Mettler, M.D., in the *New York State Journal of Medicine*, October 1, 1949, points out that criteria for evaluating psychosurgical therapy have not yet been defined adequately. For example, the particular aspects of a psychiatric condition to be treated must be limited and described, as well as the existence and extent of improvement, the potential spontaneous variations in the condition, and the effect of the procedures that accompany the surgery. This can be accomplished through study of groups of cases controlled and followed with approved comparable scientific methods.

"Improvement" in some cases after psychosurgery is undeniable. However, the reason for the effect where improvement occurs or even if the surgery is responsible is not known. Statistics are lacking, too, on the influence of the duration and nature of the mental illness in connection with improvement. The use of figures on discharges from institutions cannot be totally justified, since discharges following any or no therapy are frequent during the first 12 months, decrease in number the second year, and are a small, almost stable percentage the third year and thereafter. The nature of that improvement which warrants discharge from institutions differs from that which proves indication for surgery. Also, the figures can give no appreciation of the results that might have been achieved by some other therapy or even no therapy at all.

In the chronic institutionalized case topectomy and lobotomy are thought to give better than chance improvement, although transorbital lobotomy seems to give better results in earlier than late stages; the patients who have had good reactions to shock therapy can usually be predicted to react beneficially to psychosurgery. There is an opinion that psychosurgery tends to "externalize" so that if that is the result desired, as in patients overconcerned with themselves, their sensations, delusions, hallucinations, and personal productions, it can be accomplished by "successful" psychosurgery. It should not be attempted if the patient already is abnormally extroverted. In suicidal cases, inertia, usually considered an undesirable concommitant of total lobotomy, may be precisely the result desired. The consensus is that no one operation produces an "improvement" different from any other, nor can any beneficial effect be attributed with certainty to the surgery.

The adverse effects—incontinence, inertia, rendering the patient unable to attend to his own needs, or mortality—are observed most often after complete radical lateral transcranial lobotomy. Transorbital lobotomy, topectomy, and probably thermocoagulation and undercutting the cortex have a small death rate and fewer adverse effects. The pattern of postoperative convulsions follows that stated for these adverse effects, with thermocoagulation safer than either topectomy or undercutting of the cortex. Thalamotomy so far has shown a higher death rate, and the figures on convulsions have not been compiled. The effect of psychosurgery on pain has not been determined in such a way as to give satisfactory figures. Any discussion of the physiological effects of psychosurgery can be only speculation.

Mettler states that ". . . no case should be subjected to psychosurgery unless: (1) a complete, recent, and energetic restudy of the case has been made by a competent and industrious psychiatrist; (2) strenuous efforts have been made to readjust the patient's home environment without success, and, (3) all available, promising, less drastic therapeutic methods have been exhausted."

The neurosurgeon must depend upon the psychiatrist for the evaluation of the case, since he is equipped to make neurologic but not psychiatric diagnoses. Although barbarous, transorbital lobotomy apparently is free from complications.

Properly, psychosurgery should be left for the neurosurgeon to perform. Mettler predicts that the legal aspects pertaining to psychosurgery will soon be delineated.

TREATMENT OF HERPES ZOSTER WITH AUREOMYCIN

By accident M. L. Binder, M.D., and L. E. Stubbs, M.D., learned of a patient treated with aureomycin for a condition superimposed on a herpes (being treated then with roentgen rays). The dramatic result could have been due to either therapy. However, the use of aureomycin with favorable results could be rationalized since herpes zoster is conceived as a virus infection at the posterior nerve root.

Binder and Stubbs report four cases of their own which they treated on this basis with 500 mg. of aureomycin every 6 hours for 2 days. (See the *Journal of the American Medical Association,* December 10, 1949.) In three of the four patients the beneficial effects were spectacular. In the fourth, the results could be described as good.

The authors suggest that further investigation may prove aureomycin superior to the multitude of therapeutic agents now used empirically for this refractory condition with unpredictable and only occasional success.

USE OF LITHIUM SALTS AS A SUSTITUTE FOR SODIUM CHLORIDE

John H. Talbott, M.D., discusses the use of lithium salts as a substitute for sodium chloride in the *Archives of Internal Medicine,* January, 1950. The ideal salt substitute should meet the following criteria: (1) It should be indistinguishable in taste from sodium chloride; (2) it should be nontoxic in the quantities usually required; (3) it should be possible to add it to food at the table just as salt is added, and (4) it should not be destroyed in cooking if added to foods during preparation, nor should it be destroyed or partially decomposed if added to warm food at the table.

An aqueous solution of lithium chloride with citric acid and a trace of potassium iodide was found to best satisfy criterion 1. No other substance or combination of substances approached its palatibility and the advantage of a liquid rather than crystalline matter was that palatibility could be achieved with a very small amount. Extensive trial with both animals and humans failed to demonstrate toxic effects which were directly attributable to the lithium preparation. There were some untoward reactions when serum lithium concentrations rose above 1.0 milliequivalents but the vast majority of patients could satisfy their tastes with intakes which kept the serum concentration below 0.05 milliequivalents. It is the author's impression that many of the symptoms which have been attributed to lithium intoxication were, in reality due to sodium chloride deficiency, presence of a debilitating disease, mercurial diuretics, and digitalization.

MORTON TERRY, B.A., D.O.

EPILEPSY AS A SEQUELA OF RECURRENT MALARIA

According to David R. Talbot, M. D., Alan C. Elerding, M. D., and John O. Westwater, M. D., chronic recurrent malaria is a possible cause of convulsive seizures. Three cases are presented in *The Journal of the American Medical Association,* December 17, 1949, illustrating cerebral damage probably caused by the Plasmodium. In each case there were epileptic-like seizures and abnormal encephalograms suggesting grand mal.

The function of malaria in the production of cerebral symptoms may be that of a primary causative agent or of a trigger mechanism setting off convulsions in persons predisposed. Inasmuch as the treatment of the malarial infection is the first and most important phase of therapy, malaria must be included among the possibilities in differential diagnosis.

The authors used the newer antimalarial drugs, after which they noted marked clinical improvement and no further progress in the cerebral damage. The anticonvulsants are not effective until after the infection is under control.

CONCEPTS OF MYOCARDIAL ISCHEMIA

The concepts of myocardial ischemia are discussed by Hans S. Hecht, M.D., in the *Archives of Internal Medicine,* November, 1949, and the various factors affecting the oxygen supply or work requirements of the myocardium are listed and evaluated. Diseases of the coronary arteries are the most important of the factors leading to myocardial ischemia.

Pain as an index of myocardial ischemia is unreliable as only 50 per cent of patients demonstrated this symptom with the anoxia test. Electrocardiographic changes are discussed in detail and the significance of changes in the Q wave, S-T segment, and T wave are explained. The anoxia-electrocardiographic test is recommended as a prognostic guide.

In most instances under palliative therapy with nitroglycerin, sedation, and, occasionally, thiouracil derivatives patients with myocardial ischemia will improve when they have learned to adjust their activities to their limitatons.

MORTON TERRY, B.A., D.O.

Book Notices

FUNCTIONAL FOOT DISORDERS. With Particular Reference to Their Effect on the Lower Extremity. By John Martin Hiss, B.S., M.A., D.O., M.D., Sc.D., Orthopaedic Surgeon, Director of the Hiss Clinic, Los Angeles, Special Clinical Lecturer on Functional Disorders of Lower Extremity, Author of "New Feet for Old," "Treatment and Care of Feet," etc. and a Digest of each Chapter by John Martin Hiss, Jr., A.A., M.D., D.N.B., Associate in Internal Medicine, The Hiss Clinic, Medical Officer United States Air Force. Ed. 3, completely revised. Cloth. Pp. 824, with illustrations. Price $11.50. The Oxford Press, Los Angeles, 1949.

Twelve years have elapsed since the publication of the first edition of this book. In preparation for the third edition Dr. Hiss embarked upon a careful study of the orthopedic literature dating back as far as 1913 and carefully reviewed the records of over 300,000 feet. The records reviewed covered over a million treatments and many thousands of notations on feet which had been subjected to functional tests at the Hiss Clinic.

Dr. Hiss's long experience in the diagnosis and treatment of foot disorders has given him ample opportunity to acquire a comprehensive knowledge of feet. He has developed seven fundamentals of foot function, all of which justify the Hiss law—Comfort varies directly with function.

The first seven chapters of the book are devoted to a thorough discussion of the fundamental factors governing foot function which include support, balance, locomotion, adaptability, weight distribution, vitality, and power. Next are considered bony variations, causes and prevention of functional foot disorders, and methods of examination.

A chapter on classification and diagnosis divides feet into five general classes and fourteen types. Each of the following fourteen chapters is devoted to a particular type of foot. The type is defined, its structure described, and its management outlined. First considered is the normal balanced foot and its shoe fitting problems. The abnormalities include locked joint, structural eversion, functional eversion, combined eversion, flatfoot, hollow foot, clubfoot, arthritis, rigidity, hallux limitus, hallux valgus, and hammer toe.

The third portion of the book considers shoes, last making, and shoe fitting.

The book is profusely illustrated and each chapter is preceded by a digest prepared by John Martin Hiss, Jr., M.D., who is not an orthopedic surgeon but an internist.

The final chapter of the book, "Clinical Medicine and the Feet," was also written by Dr. Hiss, Jr. A quotation from that chapter will aptly sum up the significance of this book for the physician in general practice.

. . . it has become quite obvious to me that there are a multitude of complaints which are handled inadequately or not at all. These cases

are usually dismissed with such terms as muscle strain, sprain, backache, and so forth. The importance of these conditions lies in the large number of such cases seen by the average practising physician, yet most doctors will readily admit to uncertainty regarding these cases and their ineptness in dealing with them adequately. The high percentage of empiric prescribing attests to the symptomatic treatment and vagueness of diagnosis regarding many conditions. Certainly if we regard clinical medicine as still an art and not an exact science, any insight into some of these conditions with practical conclusions toward treatment will be of value. The foregoing pages by the author, based on the examination of 300,000 feet, have established definite clinical proof of the validity of his concepts. We must not lose sight of the most important objective—that of helping the patient.

This book is a credit to its author and the profession that he represents.

E. H. McKenna, D.O.

UNE NOUVELLE METHODE CLINIQUE ET THERAPEUTIQUE, L'OSTEOPATHIE. By Dr. R. Lavezzari. Paper. Pp. 120, with illustrations. Price 550 fr. G. Doin & Cie, 8 Place de l'Odéon, Paris 6, France, 1949.

The fact that a book on osteopathy has been written and published in France should evoke interest. The author, Dr. Lavezzari, began his studies of osteopathy during the first world war. He obtained considerable assistance in furthering his knowledge through his correspondence with Dr. Florence Cair of Brooklyn, New York.

The book presents a brief delineation of the history and principles of osteopathy followed by a discussion of the osteopathic lesion, its diagnosis, and treatment. This material is discussed by spinal areas. The concluding chapters of the book contain case histories illustrated by x-rays of characteristic osteopathic problems and the results of osteopathic manipulative therapy.

The book does not purport to be a textbook, yet it gives considerable information about the scope of osteopathy. It is a worthy attempt by a French physician to introduce the subject of osteopathy to his fellow practitioners.

Myron C. Beal, D.O.

BLAKISTON'S NEW GOULD MEDICAL DICTIONARY. Edited by Harold Wellington Jones, M.D., Colonel, U. S. Army, Retired, Contributing Editor, Encyclopedia Americana, Former Director, Army Medical Library, Washington, D.C.; Normand L. Hoerr, M.D., Ph.D., Professor of Anatomy, School of Medicine, Western Reserve University; Arthur Osol, Ph.D., Professor of Chemistry, Director of Chemistry Departments, Philadelphia College of Pharmacy and Science, Editor-in-Chief, United States Dispensatory. Cloth. Pp. 1294, with illustrations. Price, Textbook edition $8.50, Thin paper edition $10.75 and Deluxe edition $13.50. The Blakiston Company, 1012 Walnut St., Philadelphia, 1949.

A completely new medical dictionary is so rare in the experience of the medical book reviewer that it taxes critical faculties at the same time that it excites interest and the desire to examine minutely.

This new reference work, unlike the successive editions of dictionaries, was planned from the beginning as a new entity and was designed to suit the needs of the modern-day user. Edited by three men with the assistance of an editorial board and more than 100 contributors, it covers all branches of medicine and the allied sciences.

More than 300 modern texts as well as journals, yearbooks, and standard indexes were examined critically for new words and changes of usage. All definitions were written by specialists actively at work in the various fields and each entry was carefully checked and arranged according to modern lexicographic standards. All entries—including abbreviations, biographical entries, eponyms—are arranged in a single alphabetical list. Tables of arteries, vitamins, enzymes, vitamins, et cetera are in a section of their own.

Pronunciation is indicated by accents and syllable division and, whenever necessary, by a simple system of phonetic respelling. An atlas of illustrations, many of them in color, is bound into the center of the book. Cross-references integrate the illustrations with the text. The type used—which includes italics and lightface and boldface Roman—and the spacing aid in the rapid finding of any term and add to the attractive appearance of the book.

The editors, the contributors, and the publishers deserve to be congratulated on the production of an exceedingly useful reference work which can be used to advantage by everyone concerned with medicine and the allied sciences. Osteopathic physicians will be particularly pleased with the acknowledgement of the assistance of Dr. Ray G. Hulburt, late Editor of the American Osteopathic Association, which appears on page xi of this new dictionary.

OSTEOPATHIC TECHNIQUES. Edited by Samuel H. Rubinstein. Faculty advisors: John H. Eimerbrink, D.O., Professor of Osteopathic Therapeutics, Philadelphia College of Osteopathy; David Heilig, B.A., D.O., Clinical Assistant in Osteopathic Therapeutics, Philadelphia College of Osteopathy; and Warren A. Pratt, D.O., Instructor in Anatomy, Philadelphia College of Osteopathy. Pp. 72, with illustrations. Louis J. Marks, Philadelphia, 1949.

This book is actually an atlas of 4 years of osteopathic technique as taught at the Philadelphia College of Osteopathy. The editor, Samuel H. Rubinstein, is at present a senior student at the College. Some 200 photographs, each accompanied by a brief but clear and adequate description, fill the 72 pages of the book. Mr. Rubinstein did all the photographic work in addition to editing the text and supervising production. It is a well-known fact that photographs illustrating osteopathic technique are particularly difficult to make and, therefore, the editor is especially to be congratulated on the excellence of his pictures.

The book is divided into six sections. John H. Eimerbrink, D.O., Professor of Osteopathic Therapeutics, acted as faculty advisor for three sections: Extremity Techniques, Junior Techniques, and Senior Techniques; David Heilig, D.O., Clinical Assistant in Osteopathic Therapeutics, for two sections: Geriatric Techniques and Muscle Normalization; and Warren A. Pratt, D.O., Instructor in Anatomy, for the section on Orthopodiatry.

Published in a limited edition, chiefly for the students and faculty of the Philadelphia College of Osteopathy, this publication seems worthy of much wider distribution. Its clarity, resulting both from the well-chosen legends and the excellent photographs printed on a high grade of paper, recommends it not only for the student but for the physician in practice. The text presupposes wide acquaintance with anatomy and physiology—indeed it might prove dangerous in the hands of one untrained in osteopathic manipulation and in the basic sciences.

That such a text as this is largely the result of student endeavor is both noteworthy and praiseworthy. The idea was conceived by students and executed by one of them with the assistance of various members of the classes of 1949 and 1950 and with the guidance of the faculty advisors.

MASSAGE AND REMEDIAL EXERCISES IN MEDICAL AND SURGICAL CONDITIONS. By Noel M. Tidy, Member of the Chartered Society of Physiotherapy; T.M.M.G. Ed. 8. Cloth. Pp. 488, with illustrations. Price $5.25. The Williams & Wilkins Company, Mt. Royal and Guilford Aves., Baltimore, 1949.

Changes in the eighth edition of this popular volume which has been used since 1932 include additions to sections on asthma and bronchiectasis and the follow-up treatment after lobectomy, pneumonectomy, and thoracoplasty. Sciatica caused by prolapsed intervertebral disk has been treated differently. Prenatal exercises are given with a little more detail. New exercises are listed in the treatment of after effects of injury, such as stiff joints.

The book was intended for the medical gymnast and contains concisely stated, somewhat simplified explanations of conditions, their causes, general symptoms, healing, possible complications, and principles of treatment. Tidy has indicated where further information concerning physiotherapy may be found. The instruction is basic and sound.

AMERICAN OSTEOPATHIC SOCIETY OF PROCTOLOGY TO MEET

The American Osteopathic Society of Proctology will hold its Twenty-Fourth Annual Clinical Assembly in the Shamrock Hotel, Houston, Texas, April 3-5. The program will feature lectures, surgical motion pictures, and a wide variety of clinical material.

Those planning to attend should make reservations at the Shamrock Hotel immediately after March 1.

These assemblies are actually concentrated courses in postgraduate proctology. Nonmembers may attend by the payment of a $35.00 registration fee.

Make Hotel Reservations Now!

Fifty-Fourth Annual Convention

American Osteopathic Association

Stevens Hotel, Chicago—July 10 to 14, 1950

Hotel reservations for the Fifty-fourth Annual Convention of the American Osteopathic Association, to be held in the Stevens Hotel, (famed Normandie Lounge pictured at right) Chicago, July 10 to 14, should be made directly through the Stevens Hotel, Michigan Boulevard, 7th to 8th Streets, Chicago 5, Illinois. A hotel reservation blank is included on the next page for your convenience.

Rates for Stevens Hotel

Single Rooms.....$5.00 to $10.00 Double Room with Double Bed.....$7.50 to $12.50

Double Room with Twin Beds.....$8.50 to $15.00

Suite with Living Room and Bedroom.....From $18.00

Note: Single rooms are extremely limited in number. You will stand a much better chance of securing accommodations if your request calls for rooms to be occupied by two or more persons.

Important!

Please read these instructions before filling out the application on the next page.

1. All reservations must be made directly through the Stevens Hotel, Michigan Boulevard, 7th to 8th Streets, Chicago 5, Illinois. Do not send reservations to the Local Convention Arrangements Committee or to the American Osteopathic Association Central office.

2. All requests for reservations must give the definite date and hour of arrival as well as the definite date and approximate hour of departure. Names and addresses of all persons who will occupy the reservations requested must be included.

3. If you expect to attend any meetings scheduled to be held in the Stevens Hotel prior to or after the National Convention itself, these meetings must be listed by name of group and the dates must be given.

Classifications of Eligible Applicants for Hotel Accommodations

Member, Officer or Trustee, Delegate or Alternate, Scientific Exhibitor, Technical Exhibitor

(over)

Application for Hotel Accommodations for

AMERICAN OSTEOPATHIC ASSOCIATION CONVENTION

Stevens Hotel, Chicago—July 10 to 14, 1950

See Reverse side for instructions and Hotel prices

Stevens Hotel
Michigan Boulevard, 7th and 8th Streets
Chicago 5, Illinois

Date.....

Meetings to Be Attended—Be Sure to Check!

Do you plan to attend a meeting to be held prior to National Convention?.....

If so, give name of group.....Dates .....

Do you plan to attend a meeting to be held after National Convention? .....

If so, give name of group.....Dates .....

Accommodations Desired

Single Room.....Double Room with Double Bed.....Double Room with Twin Beds.....

Suite with Living Room and Bedroom.....

Time of Arrival and Departure

Arriving at Hotel (date).....hour .....A.M.....P.M.....

Leaving Hotel (date) .....hour .....A.M.....P.M.....

Guests' Names

THE NAME OF EACH HOTEL GUEST MUST BE LISTED. Therefore, please include the name of both persons for each double room or twin bedded room requested. Names and addresses of all persons for whom you are requesting reservations and who will occupy the rooms asked for:

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Individual Requesting Reservations

Name.....

Address.....

City.....Zone.....State .....

Name of Firm if Technical Exhibitor.....

ALL RESERVATIONS MUST BE RECEIVED PRIOR TO JUNE 20, 1950

Conventions and Meetings

Announcements

American Osteopathic Association, Fifty-Fourth Annual Meeting, Chicago, July 10-14, inclusive. Program Chairman, C. R. Nelson, Ottawa, Ill.

Academy of Applied Osteopathy, Eastern Postgraduate Course, Hotel Statler, New York City, April 3-6; annual meeting, Chicago, July 14, 15.

American College of Osteopathic Internists, Eastern Study Group, Philadelphia, March 30-April 2; annual meeting, Continental Hotel, Kansas City, Mo., October 23-26. Program Chairman, Stuart Harkness, Des Moines, Iowa.

American College of Osteopathic Pediatricians, Region 1, New York, March 31.

American College of Osteopathic Surgeons, Hotel Savery, Des Moines, Iowa, October 15-19. Program chairman, Howard A. Graney, Des Moines, Iowa.

American Osteopathic Academy of Orthopedics, Hotel Savery, Des Moines, Iowa, October 15-19. Program chairman, Harry F. Shaffer, Detroit.

American Osteopathic College of Radiology, Hotel Savery, Des Moines, Iowa, October 15-19; Board of Governors, October 11. Program Chairman, D. W. Hendrickson, Wichita, Kans.

American Osteopathic Hospital Association, Hotel Savery, Des Moines, Iowa, October 15-19. Program Chairman, Mr. Edward C. Barron, Detroit.

American Osteopathic Society of Proctology, Shamrock Hotel, Houston, Tex., April 3-5. Program Chairman, Marille E. Sparks, Dallas, Tex.

American Society of Osteopathic Anesthesiologists, Hotel Savery, Des Moines, Iowa, October 15-19. Program Chairman, Crawford M. Esterline, Kirksville, Mo.

Arizona, Westward Ho, Phoenix, May 12-14. Program Chairman, Geoffrey T. Lawrence, Tolleson.

Arkansas, Albert Pike Hotel, Little Rock, May. Program Chairman, L. J. Bell, Helena.

California, Sacramento, annual convention, May 3-5, Board, April 30, House of Delegates, May 1, 2.

Georgia, Hotel Thomas, Thomasville, May 12, 13.

Hawaii, April 27-29. Program Chairmen, Josephine E. Morelock and Elizabeth R. Gladding, Honolulu.

Illinois, Knickerbocker Hotel, Chicago, May 12-14.

Indiana, Fowler Hotel, Lafayette, May 14-16. Program Co-Chairmen, H. D. Wolf and John Kenney, both of Indianapolis.

Iowa, Hotel Fort Des Moines, Des Moines, May 15, 16; joint meeting of House of Delegates and Board of Trustees, May 14. Program Chairman, H. D. Meyer, Algona.

Kansas, House of Delegates, Gleason Hospital, Larned, April 29, 30; annual convention, Allis Hotel, Wichita, October 1-4. Program Chairman, Irwin J. Conant, Meriden.

Kentucky, Brown Hotel, Louisville, October 11, 12. Program Chairman, Martha Garnett, Louisville.

Maine, postgraduate seminar, Hotel Elmwood, Waterville, April. Program Chairman, Edward G. Drew, Waterville. Annual meeting, Samoset Hotel, Rockland, June. Program Chairman, Marshall J. Gerrie, Pittsfield. Semi-annual meeting, Bangor, December.

Michigan, refresher course, Hotel Statler, Detroit, April 14, 15; House of Delegates, April 16; annual meeting, Civic Auditorium, Grand Rapids, October 1-5. Program Chairman, Ralph F. Kraker, Ann Arbor.

Missouri, St. Louis, October 12-14. Program Chairman, Theodore Corcanges, Raytown.

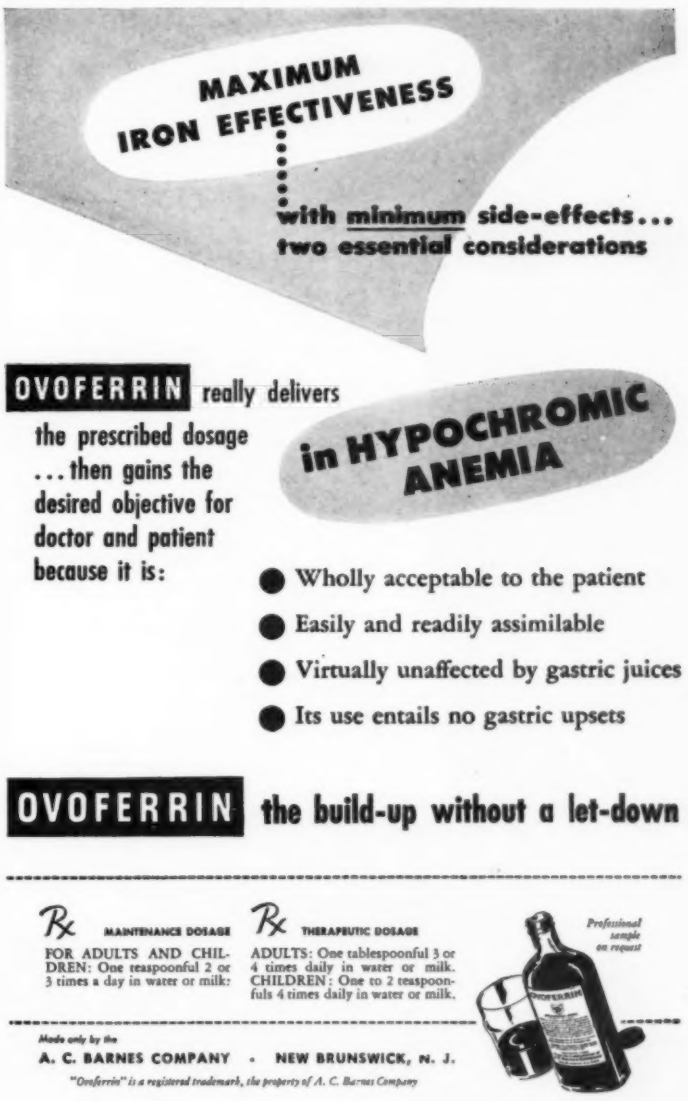
Montana, Northern Hotel, Billings, June or July. Program Chairman, T. G. Gunderson, Billings.

New Mexico, El Rancho Hotel, Gallup, September 14-16. Program Chairman, William D. Andrews, Albuquerque.

New York, Hotel Statler, New York City, October 13, 14. Program Chairman, Charles K. Smith, Elmira.

North Dakota, Rudolph Hotel, Valley City, May. Program Chairman, Harry Homewood, Valley City.

Northwest Osteopathic Conference (Washington and Oregon Osteopathic Associations), Winthrop Hotel, Tacoma, June 4-7. Program Chairman, E. D. Mosier, Puyallup, Wash.


MAXIMUM
IRON EFFECTIVENESS
with minimum side-effects...
two essential considerations
OVOFERRIN really delivers
the prescribed dosage
...then gains the
desired objective for
doctor and patient
because it is:
in HYPOCHROMIC ANEMIA
Wholly acceptable to the patient
Easily and readily assimilable
Virtually unaffected by gastric juices
Its use entails no gastric upsets
OVOFERRIN the build-up without a let-down
℞ MAINTENANCE DOSAGE
FOR ADULTS AND CHILDREN: One teaspoonful 2 or 3 times a day in water or milk.
℞ THERAPEUTIC DOSAGE
ADULTS: One tablespoonful 3 or 4 times daily in water or milk.
CHILDREN: One to 2 teaspoonfuls 4 times daily in water or milk.
Professional sample on request
Made only by the
A. C. BARNES COMPANY • NEW BRUNSWICK, N. J.
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RIB-BACKS make it Easy...
Easy ON THE SURGEON:
Superior cutting efficiency, predicated upon inimitable, uniform sharpness throughout the entire cutting edge, Rib-reinforcement—an exclusive feature that provides added strength and a degree of rigidity best calculated to resist lateral pressure, insures dependable blade performance which serves the surgeon to the greatest advantage.
Easy ON THE ASSISTANTS:
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Ohio, Deshler-Wallick Hotel, Columbus, May. Program Chairman, W. D. Henceroth, Grove City.

Oklahoma, Biltmore Hotel, Oklahoma City, November 7-9. Program Chairman, Daniel B. Heffelfinger, Oklahoma City.

Ontario, Barrie, May 5, 6. Program Chairman, J. E. Wilson, Barrie.

Oregon: See Northwest Osteopathic Convention.

Osteopathic College of Ophthalmology and Otorhinolaryngology, Ambassador Hotel, Los Angeles, November 3. Program Chairman, Edward W. Davidson, Los Angeles.

Osteopathic Cranial Association, annual meeting, Chicago, July 15, 16.

Rhode Island, Rhode Island Country Club, March 8, 9. Program Chairman, Walter M. Pelser, Wickford.

South Carolina, Wade Hampton Hotel, Columbia, May.

South Dakota, State Game Lodge, Black Hills, June 4-6. Program Chairman, M. C. Thompson, Watertown.

Tennessee, Andrew Jackson Hotel, Nashville, October. Program Chairman, Richard Alexander, Greenback.

Texas, Hotel Texas, Fort Worth, April 27-29. Program Chairman, Earle H. Mann, Amarillo.

Vermont, Rutland, October 4, 5. Program Chairman, M. C. Smith, Bennington.

Washington: See Northwest Osteopathic Convention.

Western States Osteopathic Society of Proctology, Biltmore Hotel, Los Angeles, September 25-27. Program Chairman, Lee R. Borg, Los Angeles.

West Virginia, Chancellor Hotel, Parkersburg. Program Chairman, Harry Myer, Vienna.

Wisconsin, Schroeder Hotel, Milwaukee, May 4, 5.

OFFICIAL AND AFFILIATED ORGANIZATIONS

ARIZONA

Tucson

The officers were reported in the December JOURNAL. The trustees are Ernie E. Johnson, Burton M. Gotshall, and Robert W. Grant.

Chairman of the local monthly program committee is Homer M. Fredricks. All are from Tucson.

CALIFORNIA

Cancer Commission

Garnett Cheney, M.D., Stanford, Herbert F. Traut, M.D., and B. V. Low-Beer, M.D., both of Berkeley, were scheduled to speak at the meeting January 22 in Oakland on "The Role of the General Practitioner in the Detection of Female Genital Cancer," "Surgical Aspects of Female Genital Cancer," and "The Radiological Aspects." Another feature of the meeting was the presentation of two cases of carcinoma of the cervix and the uterus, which were discussed by a Tumor Board, illustrated by slides, and the diagnosis and treatment summarized by the chairman, L. B. O'Meara, Los Angeles.

Alameda County

The subject for the meeting April 13 is scheduled to be a report on the California Osteopathic Convention.

Kern County

At the January 10 meeting Mr. Thomas C. Shumacher spoke on "Public Health in California as Related to Socialized Medicine."

Monterey Peninsula

Jesse P. Oswald, Oakland, addressed the January meeting at Loma Linda, his topic being "X-ray Diagnoses of Chest and Extremities."

Southside

A "Review of the Fact Finding Committee" will be the feature of the meeting April 7, along with the election of delegates and discussion of agenda.

COLORADO

State Association

A quarterly meeting was scheduled for February 18 in Denver.

ILLINOIS

First District

H. F. Garfield, Danville, was the principal speaker at the meeting February 9 in Chicago, according to an advance announcement. His subject was to be the management of the cardiac patient in the home.

Fifth District

At the January 22 meeting in Bement Ward E. Perrin, Chicago, spoke on liver disease, illustrating his lecture with slides.

INDIANA

First District

The officers are: President, John R. Kenney; vice president, Nadine B. Fisher, and secretary-treasurer, H. Dearing Wolf. All are from Indianapolis.

KANSAS

Eastern

A. A. Choquette, Kansas City, Mo., was the scheduled guest speaker at the January meeting.

Northeastern

The officers are: President, Forrest H. Kendall, Holton; vice president, E. R. Palmer, Atchison, and secretary-treasurer, S. Ann Wiegers, Marysville. All were re-elected.

Sedgwick County

The officers are: President, Charles Stees; vice president, Gale G. Elder, both of Wichita, and secretary-treasurer, H. H. Dearing, Cheney.

MAINE

York County

The officers are: President, Richard H. Wallace, Hollis Center; vice president, Joseph P. Gerardi, Biddeford, and secretary-treasurer, John K. Roberts, Sanford.

Committee chairmen are: Membership, Sargent Jealous, Saco; ethics, Dr. Roberts; hospitals, John F. Schatzman, Kennebunk; clinics, Dr. Wallace; statistics, Dr. Gerardi; convention program, William Scott Perkins, York Harbor; convention arrangements, Francis J. Yukl; legislation, C. Blanchard Robbins, the latter two of Kittery; public health, Dana A. Rowe, Limerick; industrial and institutional service and public relations, Dr. Schatzman.

MASSACHUSETTS

State Society

The officers are: President, Samuel B. Jones, Worcester; vice president, John A. Robertson, Arlington; secretary, Robert R. Brown (re-elected), Belmont; treasurer, Amalia Sperl (re-elected), Haverhill; legislative chairman, Raymond W. Boyd, Lynn, and executive secretary, Mrs. Gladys M. Stockdale, Newtonville.

MICHIGAN

Central

The officers are: President, H. William Guinand, Riverdale; vice president, R. E. Benson, St. Johns, and secretary-treasurer, William R. Price, Belding.

Eastern

The officers are: President, John J. Zusga, Sebewaing; vice president, Lanson C. Cobb; secretary-treasurer, William F. Scully, the latter two of Marine City. All were re-elected.

The committee chairmen are: Membership, John H. Earnshaw, Port Hope; ethics, Roy S. Young, Harbor Beach; hospitals, D. Arthur Shimmin, Sandusky; clinics, Douglas M. Baird, Sr., Deckerville; statistics, Randall G. Bostick, Mt. Clemens; convention program and arrangements, Dr. Cobb; legislation, Harold W. Laidlaw, Bad Axe; vocational guidance, Dwight D. Walker; public health, John V. Wilkes; industrial and institutional service, John H. Nuhn, all of Port Huron, and public relations, Dr. Zusga.

Kalamazoo Tri-County

The officers and trustees were reported in the February JOURNAL.

The committee chairmen are: Ethics, A. E. Van Vleck, Paw Paw; hospitals, Robert A. Pryor; legislation, J. M. Jennings; vocational guidance, W. E. Gilkey; industrial and institutional service, George H. Voyzey, all of Kalamazoo; public health and public relations, E. L. Wheat, Allegan.

Kent County

The officers are: President, Roy G. Bubeck, Jr.; vice president, Maurice R. Lee, both of Grand Rapids; secretary, Harold R. Myers, Lowell, and treasurer, Joseph G. King, Grand Rapids.

The trustees are Arthur T. Taylor and Eugene J. Gasick, both of Grand Rapids.

Macomb County

The officers are: President, Daniel W. McKinley, East Detroit; vice president, J. Calvin Geddes, Mt. Clemens; secretary-treasurer, Stanley S. Conrad, Roseville; trustee, Raymond G. Markle, Mt. Clemens.

Northeastern

The officers are: President, Al D. Hammond (re-elected), Roscommon; vice president, Louis Aldus, Rose City, and secretary-treasurer, Edward G. Papp (re-elected), Prescott.

The committee chairmen are: Ethics and public health, Dr. Papp; statistics, Dr. Aldus, and public relations, Dr. Hammond.

Northwestern

The officers are: President, Frank S. Thomas, Traverse City; vice president, George K. Green, Elk Rapids, and secretary-treasurer, A. F. Finzel, Kingsley.

Saginaw Valley Academy

The officers are: President, Irving W. Graw, Saginaw; vice president, Christina M. Schutte, Clare; secretary-treasurer, M. B. Goldberger (re-elected), Saginaw

The committee chairmen are: Membership and medical legal, Dr. Goldberger; ethics, Graham W. Stewart; clinics, Arthur P. Bumstead; convention arrangements, Verne L. Rice; legislation, Hobert C. Moore, all of Bay City; statistics, Lynn Hooker, Freeland; convention program, Chester S. Chicky; hospitals, Alfred A. Ferris; public health, M. Merril Mayne; industrial and institutional service, Archie R.

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*Northern, C. Bulletin of Fla State Dept. of Agric., No. 123:P 20-23

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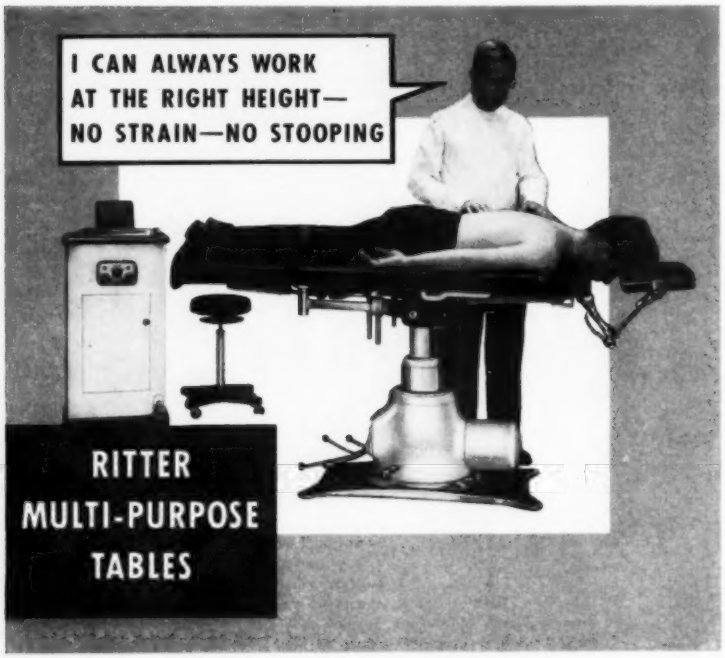

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Southwestern

The officers are: President, J. M. Brown, Berrien Springs; vice president, E. V. Sergeant, Coloma, and secretary-treasurer, C. J. Zwissler, Benton Harbor.

Western

The officers are: President, F. E. Durnell, Muskegon Heights; vice president, Sidney L. Michelman, and secretary-treasurer, Hilden T. Blohm, both of Muskegon.

Wayne County

The officers are: President, H. A. Fisher; vice president, Donald J. Evans; secretary-treasurer, John H. Morrison, and statistician, Edmund A. Bowman, all of Detroit.

The trustees are C. B. Potter and William F. Costello, Trenton.

MINNESOTA

State Society Auxiliary

The officers are: President, Mrs. G. A. Stohlberg, Stillwater; first vice president, Mrs. Phil Morrison, Faribault; second vice president, Mrs. A. J. Schneider, Willmar; treasurer, Mrs. E. C. Sheggeby, Montevideo, and secretary, Mrs. R. A. Lentz, New Ulm.

MISSOURI

Buchanan County

A program on x-ray, x-ray interpretations, and x-ray therapy was presented by Charles L. Curry, Ray E. Bishop, and Hervey S. Scott, all of Kansas City, at the all-day joint meeting January 15 with members of the Northwest District in St. Joseph.

Central

D. M. Davidson, St. Louis, addressed the meeting January 19 in Mexico.

Central Ozark

At the January 12 meeting in Rolla the subject presented was "Visual Problems of the School Age Child." The February 2 meeting was scheduled to be held at Newburg.

Northwest District

See Buchanan County.

St. Louis

A meeting was announced for January 17.

Southeast

The January 15 meeting was held at Campbell.

West Central

The study of cervicitis, its diagnosis, etiology, and treatment was the program for the January 19 meeting at Warrensburg. There were demonstrations of cervical conization by electrosurgery and of other minor operations and office technics done electrosurgically.

NEW JERSEY

Essex County

John D. Dennis, Orange, presented a speech on "Compensation Related to Private Practice" at the February 22 meeting, according to an advance announcement.

NEW YORK

State Society

The officers were reported in the December JOURNAL.

The department heads are: National affairs, William S. Prescott, Syracuse; professional affairs, John R. Pike, Albany; public affairs, William B. Strong, Brooklyn; public health, David J. Bachrach, New York, and state affairs, George T. Smith, Rochester.

The committee chairmen are: Convention program, Charles K. Smith, Elmira; public education on health and Federal-State coordinator, Dr. Prescott; osteopathic veterans and vocational guidance, Clarence Edwin Long, Jr., Buffalo; unit contact, Lawrence S. Robertson; ethics and vigilance, William O. Kingsbury; public relations, A. Leon Smeyne, the latter three of New York City; Federal service, Samuel H. Scott, Albany; emergency medical services, James H. Reid; workmen's compensation, Hewett W. Strever; finance and budget, Merritt C. Vaughan, the latter three of Rochester; Osteopathic Progress Fund, Lewis B. Spence, White Plains; professional insurance, Edith E. Dovesmith; student loan fund, Edwin R. Larter, both of Niagara Falls; graduate education, Dr. Strong; public health, Francis J. Beall, Jr., Syracuse; clinics and hospitals, Warren J. E. Tucker, Port Washington; state and social medicine, Albert W. Bailey, Schenectady; constitution and bylaws, Alvah H. Leeds, Yonkers; health and accident insurance and membership, Robert E. Cole, Geneva.

Central (Third District)

The officers are: President, Tefft T. Bassett; vice president, William K. Howes, and secretary, C. W. W. Hoffman.

The committee chairmen are: Hospitals, Fred I. Gruman; public health, Francis J. Beall, Jr.; public relations, Dr. Hoffman, and Osteopathic Progress Fund, Robert R. Ross.

All are from Syracuse.

City of New York

The program for the refresher course, held in conjunction with the Osteopathic Clinic and Hospital of New York, January 30 through February 3, consisted of the following scheduled addresses: Otterbein Dressler, "Physiopathology and Diagnosis of Common Bone Disorders"; Victor R. Fisher, "Cardiac Emergencies—Recent Advances in Diagnosis and Treatment"; Arthur M. Flack, "Recent Advances in Diagnosis and Surgical Treatment of Diseases of Heart and Lungs"; Frederick A. Long, "Neuropsychiatry"; Arnold Melnick, "Avoiding the Neurotic Pattern in Children." All the speakers were from Philadelphia.

Medical films presented were to be on allergy, immunology, and treatment; management of the failing heart; cervicitis, diagnosis and management; early detection of cancer, and otitis media in pediatrics.

Long Island

A meeting was held January 17.

Westchester County

Eugene J. Casey, Binghamton, was the guest speaker at the meeting January 20 in White Plains.

OHIO

First District Academy (Toledo)

Warren Wood Custis, Dayton, is scheduled to present a lecture-demonstration on "Osteopathic Manipulative Technic" at the meeting April 19.

Second District Academy (Sandusky)

At the January meeting B. K. Powell, Lorain, demonstrated a ceiling projector for bedridden patients and Leonard C. Nagel, Cleveland, spoke on "Orthopedic Problems." A meeting was scheduled for February 1.

Thirteenth District Academy (Columbus)

Ralph G. Reesman, Lancaster, was scheduled to talk on "Osteopathic Technic and the History of Osteopathy" at the meeting January 19 in Columbus.

Fourteenth District Academy (Marietta)

Edgar Q. Lamb, Columbus, spoke at the meeting December 1 in Zanesville on "Heart Sounds."

Fifteenth District Academy (Cincinnati)

Mr. William S. Konold was the featured speaker at the January 12 meeting. He discussed the organizing of an osteopathic hospital.

"Diarrhea" was the subject of the address by William J. Loos, Chicago, at the meeting February 9.

OKLAHOMA

Central

The officers are: President, John Lowe (re-elected), Wewoka, and secretary-treasurer, D. L. Wenrick (re-elected), Wetumka.

Chairman of the public relations committee is Dr. Lowe.

TEXAS

State Society

The officers, trustees, and committee chairmen have been listed in the June and August JOURNALS. In addition to the trustees in the June JOURNAL, the following have been named: Joseph L. Love, Austin; R. H. Peterson, Wichita Falls; Wiley B. Rountree, San Angelo; Merle Griffin, Corpus Christi, and Keith S. Lowell, Dallas.

District One

The officers were listed in the January JOURNAL.

The committee chairmen are: Membership, G. Welton Gress; ethics, Norman M. Harris; clinics, Lester J. Vick; public health and legislation, Earle H. Mann, all of Amarillo; hospitals, John V. London, Groom; statistics, Robert E. Lingenfelter, Hereford; convention program, Edward M. Whitacre; public relations, G. G. Porter; vocational guidance, Horace A. Emory, all of Lubbock; industrial and institutional service, J. Paul Price, Jr., Dumas.

District Three

A meeting was to be held January 15 in Longview.

District Eight

The February 5 meeting took place in Weslaco.

Dallas County

Mr. Willis Tate was the guest speaker at the meeting January 12.

Tarrant County

Samuel F. Sparks, Dallas, was scheduled to discuss "Acute Surgical Problems" at the January meeting.

WISCONSIN

Fox River Valley

Margaret Mattern, Green Bay, was the principal speaker at the January meeting in Appleton. A meeting was scheduled for February 9 in Oshkosh.

Milwaukee

A meeting was scheduled for February 2.

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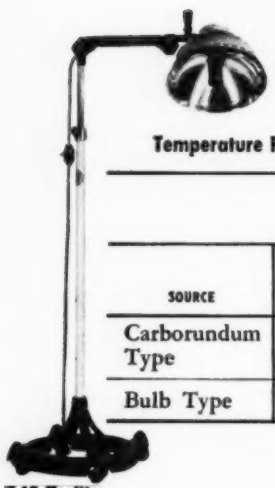

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*Arch. Physical Medicine, 30:691-99 (November) 1949.

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MILTON, WISCONSIN

Northwest

The officers are: President, Edward C. Mossman, Chippewa Falls, and secretary, Clarence M. Scott, Eau Claire.

At the January 6 meeting Dr. Scott was the principal speaker.

CANADA

Manitoba

The officers are: President, Edwin G. Bricker; vice president, R. M. Cornelius; secretary, L. B. Mason; and treasurer, G. Glenn Murphy, all of Winnipeg. These officers were all re-elected.

SPECIAL AND SPECIALTY GROUPS

AMERICAN OSTEOPATHIC SOCIETY FOR THE STUDY AND CONTROL OF RHEUMATIC DISEASE

Clayton O. Meyer, Des Moines, Iowa, formerly vice president, is now serving as president.

ILLINOIS OSTEOPATHIC SOCIETY OF RADIOLOGY

Ellis Siefer, Chicago, was scheduled to present an illustrated lecture, "Radiographic Urology," at the all-day meeting February 12 at the Morrison Hotel in Chicago. Other features on the agenda were a discussion period to be conducted by Dr. Siefer and an individual members problem period conducted by Jack Grant and John Poehner, both of Chicago.

MICHIGAN OSTEOPATHIC SOCIETY OF OBSTETRICIANS AND GYNECOLOGISTS

The officers are: President, Roy G. Bubeck, Jr., Grand Rapids; vice president, Harold C. Bruckner, Clio; and secretary-treasurer, Charles K. Norton, Royal Oak.

MISSOURI CRANIAL STUDY GROUP

The officers are: President, Glenn A. Baird, Hiawatha, Kans.; vice president, William F. Englehart, St. Louis; secretary-treasurer, Hollis Rhineberger (re-elected), Kirkwood, and convention program, Nelle D. Turney, St. Joseph.

MISSOURI OSTEOPATHIC SOCIETY OF RADIOLOGY

D. W. Hendrickson, Wichita, Kans., was scheduled to address the February 26 meeting in St. Louis, his subject being "Radiological Considerations of Diseases of the Thorax with Special Emphasis on Diseases of the Lungs."

Charles J. Karibo, Detroit, has been announced as the speaker for the meeting April 30 in St. Joseph.

NEW JERSEY OSTEOPATHIC ASSOCIATION OF SCHOOL MEDICAL INSPECTORS

The officers are: President, Ralph W. Davis, Jr., Audubon; vice president, George W. Northup, Livingston; secretary, John H. Beckman, Caldwell; treasurer, William C. Bugbee, Montclair.

The committee chairmen are: Membership, Edwin T. Ferren, Camden; ethics, George S. Gardner, Spring Lake; hospitals and clinics, Alfred L. Hoffman, East Orange; statistics, Rocco Cleffi, Dover; convention program, Harry F. Mintzer, Woodlynne; convention arrangements, Mrs. Sarah M. Sanderson, Audubon; legislation, Harry A. Sweeney, Atlantic City; public health, H. Thurston Maxwell, Morristown; vocational guidance, Guy W. Merryman, Collingswood; industrial service, J. Raymond McSpirit; institutions, Stephen Szalay, both of Teaneck; public relations, Davis S. Steinbaum, Bayonne.

OKLAHOMA OSTEOPATHIC RADIOLOGICAL SOCIETY

The officers are: President, A. G. Reed (re-elected), Tulsa; vice president, Ivan L. Clark, Kingfisher; secretary-treasurer, G. E. M. Risberg (re-elected), Chickasha, and program chairman, Richard T. Almquist, Oklahoma City.

OSTEOPATHIC ROENTGEN-RAY SOCIETY OF OHIO

The officers are: President, Theodore C. Hobbs, Columbus, and secretary-treasurer, Raymond L. Wright, Toledo.

Chairman of the convention program committee is Dr. Hobbs.

OSTEOPATHIC SURGICAL SOCIETY OF LOS ANGELES

Orel F. Martin, Coral Gables, Fla., is scheduled to address the meeting March 6 in Los Angeles. His subject is to be "Surgical Progress in the Osteopathic Profession."

PENNSYLVANIA OSTEOPATHIC RADIOLOGY SOCIETY

The officers are: President, Paul T. Lloyd, Philadelphia; vice president, A. E.

Kegerreis, Lancaster; secretary-treasurer, W. L. Tanenbaum, Philadelphia.

The trustees are: Kenneth L. Wheeler, Frederick E. Mowry; Dr. Lloyd, and Dr. Tanenbaum, all of Philadelphia; Paul B. Miller, Allentown, and Dr. Kegerreis.

A meeting was scheduled for February 23 at the Philadelphia College of Osteopathy.

PUGET SOUND ACADEMY OF APPLIED OSTEOPATHY

The program announced in advance for the February 18 meeting in Seattle included "Bones of the Orbit," Thomas C. Herren, Kelso; "Technic," H. V. Hoover, Tacoma, and William A. Newland, Seattle; "Physiological Movements of the Spine," Dr. Hoover; "Lumbosacral Technic," J. Lowell Kinslow, and "Surgical Treatment of Fractures," C. Wallace Roehr, both of Seattle.

SOUTHEASTERN OSTEOPATHIC SOCIETY OF RADIOLOGY

The officers are: President, William Midgen (re-elected), Cocoa, Fla.; vice president, D. A. Musselman, Ft. Lauderdale, Fla.; secretary-treasurer, W. S. Horn, Palmetto, Fla.

The chairman of the membership committee is Joseph R. Leary, Jr., Miami, Fla.

State and National Boards

ALBERTA

Examinations in April in Edmonton. Address Acting Registrar, G. B. Taylor, Office of the Registrar, Edmonton.

ARIZONA

Basic science examinations June 20 in Tucson. Applications must be filed 2 weeks prior to examination date. Address Francis A. Roy, Ph.D., secretary, Basic Science Board, University of Arizona, Tucson.

ARKANSAS

Basic Science examinations in May. Address L. E. Gebauer, M.D., secretary, Basic Science Board, 701 Main Street, Little Rock.

CALIFORNIA

Examinations April 5-7 in Los Angeles. Address Glen D. Cayler, D.O., secretary, State Board of Osteopathic Examiners, 301 Forum Bldg., Sacramento.

Wesley H. Taylor, Redwood City, and Eugene C. Darnall, Berkeley, were reappointed as members of the Board for terms ending December, 1952.

COLORADO

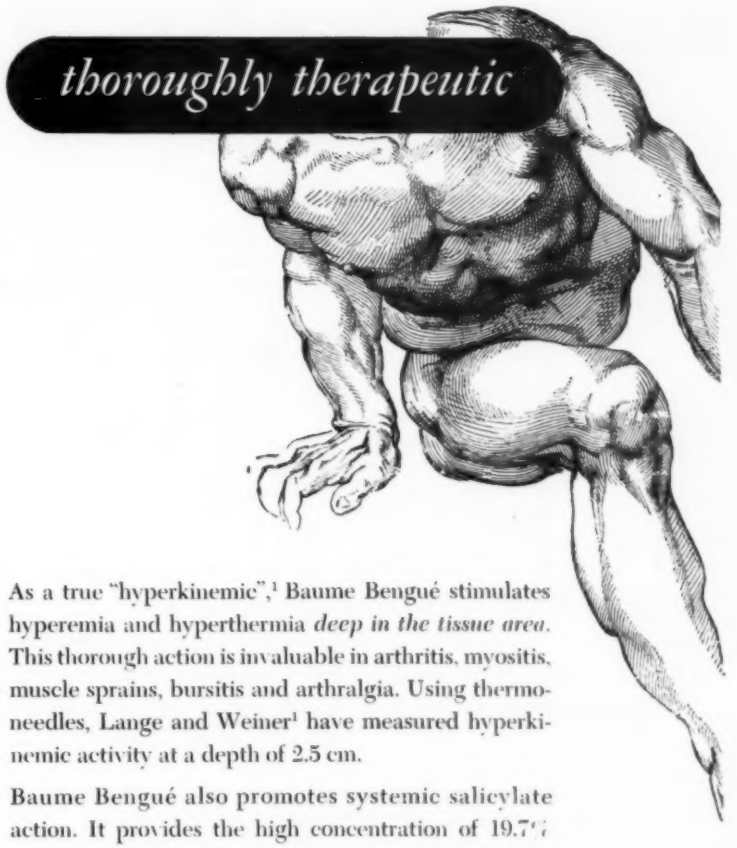
Examinations April 4. Address Walter W. King, M.D., secretary, State Board of Medical Examiners, 227 16th Street, Denver 2.

CONNECTICUT

Examinations March 14. Address H. Wesley Gorham, D.O., secretary, Osteopathic Examining Board, 520 West Avenue, Norwalk.

Frank Poglitsch, New Britain, has been appointed to the Board for a term which will expire in July, 1952.

Basic science examinations June 10. Address Miss M. G. Reynolds, Executive Assistant, State Board of Healing Arts, 110 Whitney Ave., New Haven 10.



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1. Lange, K., and Weiner, D. J. Invest. Dermat. 12:263 (May) 1949.

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DISTRICT OF COLUMBIA

Basic science examinations April 17, 18 in Washington. Professional examinations May 8, 9 at George Washington University Medical School, Washington. In both instances applications must be filed by April 1. Address Daniel L. Seckinger, M.D., secretary, Health Dept., Commission on Licensure, East Municipal Bldg., Washington.

FLORIDA

Professional examinations in June in St. Petersburg. Address Richard S. Berry, D.O., secretary, State Board of Osteopathic Medical Examiners, 617-18 Times Bldg., St. Petersburg 5.

Basic science examinations June 3 in Gainesville. Applications must be filed by May 22. Address M. W. Emmel, D.V.M., secretary, State Board of Examiners in the Basic Sciences, University of Florida, Gainesville.

HAWAII

Examinations April 12. Address Mabel A. Runyan, D.O., secretary, Board of Osteopathic Examiners, 2333 C. Kalakaua Avenue, Honolulu 30.

IDAHO

Examinations June 8 in Boise. Applications must be filed 15 days prior to examination. Address D. W. Hughes, D.O., secretary, Board of Osteopathic Examiners, 203 Noble Bldg., Boise.

ILLINOIS

Examinations April 4-6 and June 13-15 in Chicago. Applications must be filed 15 days prior to examination. Address Charles F. Kervin, Superintendent of Registration, Department of Registration and Education, State House, Springfield.

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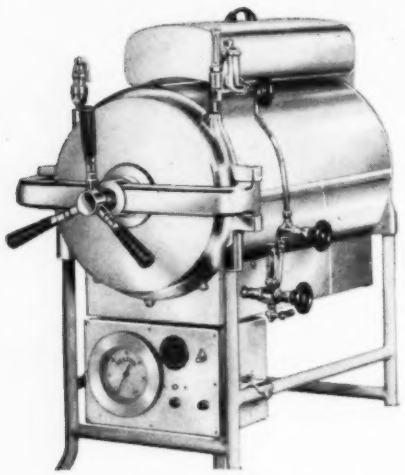

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INDIANA

Examinations June 14-16, in Indianapolis. Address Paul R. Tindall, M.D., secretary, State Board of Medical Registration and Examination, 20 N. Pike St., Shelbyville.

IOWA

Basic science examinations April 11 in Des Moines. Applications may be received up to the time of examinations. Address Ben H. Peterson, Ph.D., secretary, Board of Basic Science Examiners, Coe College, Cedar Rapids.

KANSAS

Examinations in June in Topeka. Applications must be filed 30 days before the examination. Address Forrest H. Kendall, D.O., secretary, State Board of Osteopathic Examination and Registration, 420½ Penn, Holton.

KENTUCKY

Examinations June 14-16 in Louisville. Applications must be filed 10 days prior to examination. Address Miss Ray Wunderlich, Director, Medical Licensure & Registration, State Board of Health, 620 S. Third St., Louisville 2.

Carl J. Johnson, D.O., Louisville, has been re-appointed as a member of the State Board of Health, for a term expiring December 31, 1953.

LOUISIANA

Carl E. Warden, Lake Charles, recently was appointed to the State Board of Osteopathy for a term expiring in 1954. Walter T. Colquitt, Shreveport, was re-appointed, his term expiring in 1952.

MAINE

Examinations June 13, State House, Augusta. Address George Frederick Noel, D.O., secretary, Board of Osteopathic Examination and Registration, Monument Square, Dover-Foxcroft.

MARYLAND

Examinations in June in Baltimore. Applications must be filed by May 31. Address Walter H. Waugaman, D.O., secretary, State Board of Osteopathic Examiners, 33 S. Centre St., Cumberland.

MICHIGAN

Basic Science examinations May 12, 13 at Wayne University, Detroit, and the University of Michigan, Ann Arbor. Applications must be filed before May 1. Address Miss Eloise LeBeau, secretary, State Board of Examiners in the Basic Sciences, 101 N. Walnut St., Lansing.

MINNESOTA

Basic science examinations April 4, in Minneapolis. Applications must be filed 1 week before examination. Address Raymond Bieter, M.D., secretary-treasurer, State Board of Examiners, 126 Millard Hall, University of Minnesota, Minneapolis 14.

Professional examinations March 14. Address George F. Miller, D.O., secretary, Board of Osteopathic Examiners, 601 Dayton Ave., St. Paul 2.

MONTANA

F. L. Anderson, Miles City, succeeds W. C. Dawes, Bozeman, as a member of the Board of Osteopathic Examiners.

NEBRASKA

Basic science examinations May 2, 3, University College of Medicine, Omaha. Applications must be filed 15 days prior to examination. Address Mr. Oscar F. Humble, director, Bureau of Examining Boards, State House, Lincoln.

Orville D. Ellis, D.O., Lincoln, has been appointed to the Osteopathic Board of Examiners for a term expiring in 1952.

NEW MEXICO

Basic science examinations May 7. Address Miss Margaret Kilkenny, Assistant Secretary of State, c/o Office of Secretary of State, Santa Fe.

NEW YORK

Examinations June 27-30, Albany, Buffalo, New York, and Syracuse. Applications must be filed 15 days prior to examination. Address Jacob L. Lochner, Jr., M.D., secretary, State Board of Medical Examiners, State Department of Education, 23 S. Pearl Street, Albany 7.

OHIO

Examinations June 14-17 in Columbus. Applications must be filed 10 days prior to examination. Address H. M. Platter, M.D., secretary, State Medical Board, 21 W. Broad St., Columbus 15.

OKLAHOMA

Basic science examinations April 11, auditorium, Oklahoma University School of Medicine. Address the Secretary of State, State Capitol, Oklahoma City, Okla.

ONTARIO

Examinations in June in Toronto. Applications must be filed by June 1. Address Mr. John C. Beer, secretary, Board of Regents, Drugless Practitioners Act, Room 615, 57 Bloor St., W., Toronto 5.

OREGON

Examinations April 28, 29. Address Mr. Howard I. Bobbitt, Executive Secretary, Board of Medical Examiners, 608 Failing Bldg., Portland.

RHODE ISLAND

Professional examinations April 6. Basic science examinations May 10. Applications must be filed before April 30. Address Mr. Thomas B. Casey, Administrator of Professional Regulations, 366 State Office Bldg., Providence.

SOUTH DAKOTA

Basic science examinations the first week in June. Address Gregg M. Evans, Ph.D., secretary, Basic Science Board, Yankton College, Yankton.

TENNESSEE

Basic science examinations March 17, 18 in Memphis and Nashville. Address O. W. Hyman, M.D., secretary, Board of Basic Science Examiners, 874 Union Avenue, Memphis.

Otho Y. Yowell, Chattanooga, has been reappointed as member of the State Board of Examination and Registration for Osteopathic Physicians for a term expiring December 5, 1954.

TEXAS

Basic science examinations April 21, 22 in Austin. Address Brother Raphael Wilson, secretary, State Board of Examiners in the Basic Sciences, St. Edwards University, Austin.

VERMONT

Examinations in June at the State House in Montpelier. Applications must be filed by June 15. Address Charles D. Beale, D.O., secretary, Board of Osteopathic Examination and Registration, Mead Bldg., Rutland.

VIRGINIA

Examinations June 23, 24, Richmond Hotel, Richmond. Applications must be filed 10 days prior to examination. Address K. D. Graves, M.D., secretary, State Board of Medical Examiners, 631 First St., S. W., Roanoke.

WISCONSIN

Basic science examinations April 1, Assembly Chamber, State Capitol, Madison. Applications must be filed by March 25. Address Prof. W. H. Barber, secretary, State Board of Examiners in the Basic Sciences, 621 Ransom Avenue, Ripon.

WYOMING

Examinations June 5, 6 in Cheyenne. Address G. M. Anderson, M.D., secretary, State Board of Medical Examiners, State Capitol, Cheyenne.

RE-REGISTRATION OF OSTEOPATHIC LICENSES

March 31—Georgia; no registration fee, professional tax, $15.00. Address Russell E. Andrews, D.O., secretary, Board of Osteopathic Examiners, 304 First National Bank Bldg., Rome.

April 1—Wyoming, $2.50. Address G. M. Anderson, M.D., secretary, State Board of Medical Examiners, State Capitol, Cheyenne.

April 15—Montana, $2.00 for residents; $1.00 for non-residents. Address Asa Willard, D.O., secretary, Board of Osteopathic Examiners, Wilma Bldg., Missoula.

May 1—Iowa, $1.00. Address Mr. Dwight S. James, assistant secretary, Board of Osteopathic Examiners, 200 Walnut Bldg., Des Moines 9.

May 1—Washington, $2.00. Address Mr. George C. Starlund, acting director, State Department of Licenses, Olympia.

EXAMINATIONS BY NATIONAL BOARD

The National Board of Examiners for Osteopathic Physicians and Surgeons conducts Parts I and II of its examination on the first Thursday and Friday of each May and December at the six approved colleges. Application blanks may be obtained from the secretary, and the completed application blank together with a passport photograph and check for the part or parts to be taken, must be in the Secretary's office by the November 15, or April 15 preceding examination. Part III of the examination will be given in specific locations at the discretion of the Board for the convenience of the applicant.

Examinations in Part I consist of anatomy, physiology, pathology, chemistry, and bacteriology. Part II consists of examination in mental diseases, surgery, obstetrics and gynecology, pediatrics, public health, osteopathic theory and practice. Part III is an oral examination.

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HEALTH AND LONGEVITY AT THE MID-CENTURY*

The war of the past half century against preventable sickness and premature death has been extraordinarily successful in our country. The marked gains reflect the advances in medical science and practice, the increase in the facilities for the care of the sick, improvement in sanitation, the measures taken against occupational hazards, and quite generally, the rise in the standard of living. A good picture of the beneficial effect which these measures have had on mortality is provided by the experience of the many millions of Industrial policyholders of the Metropolitan Life Insurance Company.

NEW LOW DEATH RATE

The death rate among these insured has long been declining and reached an all-time low in 1949. The rate of 6.4 per 1,000 last year was 2 per cent below the previous minimum recorded in 1948, fully 14 per cent below the rate of 10 years ago, and only about one half that registered in 1911, the earliest year in this insurance series. In general, health conditions were favorable throughout the past year. Neither the heat wave in mid-summer nor the epidemic of acute poliomyelitis materially affected the mortality as a whole.

INCREASE IN LONGEVITY

The improvement in mortality in 1949 over 1948 resulted in an increase of about .6 of a year in the expectation of life at birth among the Industrial policyholders. In the past four decades the expectation of life has risen steadily, from 46.6 years in 1911-1912 to 67.8 years in 1949, a gain of more than 21 years. During this period, American wage-earners and their families, as represented in this insurance experience, have shown a somewhat greater gain in expectation of life than has the population as a whole. The difference of 6½ years in favor of the general population in 1911-1912 has now been virtually erased.

MORTALITY BY AGE

Every age period has benefited from the decline in mortality, but the decreases have been largest in childhood and early adult life. In the past four decades, the reduction in the age groups under 35 years amounted to more than 70 per cent for white males and to well over 80 per cent for white females, truly an astonishing record. But even at ages 65-74 the improvement came to 37 per cent and 47 per cent for white males and females, respectively. Nor are the striking changes in the age picture limited to long-range comparisons. Even as compared with 1948, the death rate in 1949 recorded a decline at almost every age period in each sex.

INFLUENZA AND PNEUMONIA

An important factor in the favorable mortality record of recent years has been the relatively low incidence of the respiratory diseases. In addition, the effective use of the newer methods of treatment has reduced sharply the death rate from pneumonia. In 1949, for the first time, the death rate from influenza and pneumonia combined was less than 20 per 100,000 in this insured group. Only six years ago the rate was twice as high, and in 1937, before chemotherapy and the antibiotics were used, it was more than four times as high. In the early 1930's, when the serum treatment began, influenza and pneumonia were outranked only by cancer and the diseases of the heart as a cause of death.

TUBERCULOSIS

Even more notable has been the record for tuberculosis. In the past 40 years, this disease has dropped from first to seventh in rank as a cause of death. The tuberculosis death rate among the Industrial policyholders decreased from 224.6 per 100,000 in 1911 to 24.1 in 1949, a reduction of nearly 90 per cent. In the postwar period the drop in mortality has proceeded at an accelerated rate, averaging about 10 per cent a year. If this rate of decline continues, it will not be long before the disease takes its place among the minor causes of death.

*Reprinted from *Statistical Bulletin*, Metropolitan Life Insurance Co., January, 1950.

These impressive gains against tuberculosis are all the more remarkable in that they were achieved without the aid of any specific method of preventing or treating the disease. The major factors have been the raised standard of living, the increased facilities for the detection and treatment of the disease, the isolation of large numbers of open cases, and the educational campaign to prevent the spread of the disease.

COMMUNICABLE DISEASES OF CHILDHOOD

The drop in mortality from the principal communicable diseases of childhood has been nothing short of spectacular. For the four diseases combined—measles, scarlet fever, whooping cough, and diphtheria—the death rate at ages 1 to 14 years declined from 171.8 per 100,000 policyholders in 1911 to 2.6 in 1949, a drop of 98 per cent. Forty years ago, the mortality from diphtheria alone among these insured children was more than 30 times the present rate for all four diseases combined.

MATERNAL MORTALITY

The hazards incidental to childbearing, which had long resisted efforts to control them, have been greatly reduced in fairly recent years. In this insurance experience the puerperal death rate dropped two thirds in the past decade, although the birth rate had increased by more than one third. In the general population of the United States, the maternal mortality dropped from 4 per 1,000 live births in 1939 to about 1 per 1,000 in 1949.

OTHER NEW LOW RECORDS

The list of diseases recording minimum death rates in 1949 includes, in addition to those already mentioned, syphilis, appendicitis, diarrhea and enteritis, and typhoid fever. The death rate from syphilis last year was only one half that recorded in 1911; for appendicitis the reduction was four fifths. Even greater has been the decrease in the mortality from diarrhea and enteritis and from typhoid fever, both of which were important causes of death 40 years ago.

ACUTE POLIOMYELITIS

One of the unfavorable features of the year was the high incidence of acute poliomyelitis. More than 42,000 cases were reported in the general population of the United States, as compared with less than 28,000 in 1948. Measured in terms of reported incidence of the disease, 1949 was one of the worst years on record. Fortunately, this was not true as regards mortality. While the death rate among the Industrial policyholders was 1.7 per 100,000 in 1949, as compared with 1.0 in the preceding year and with an average of .7 in the 10 years 1938 to 1947, it was small as compared with the 12.2 per 100,000 registered in the epidemic year 1946.

CANCER AND DIABETES

In contrast with the marked downward trend in the mortality from many of the infectious diseases, the *recorded* death rates from the diseases of middle and later life have shown little change, or have increased in the past 40 years. Much, if not all, of these increases, however, arise from the aging of the population. The situation with respect to cancer illustrates the point. The recorded death rate from cancer among the Industrial policyholders rose from 68.0 per 100,000 in 1911 to 113.1 in 1949. If the age composition of the policyholder group in the earlier year had been the same as in 1949, the cancer death rate in 1911 would have been 106.9. If one further makes allowance for the increased recognition and reporting of the disease as a cause of death, it becomes doubtful that a rise has actually taken place in the mortality from cancer.

Similarly, the increase in the recorded death rate from diabetes, from 13.3 per 100,000 in 1911 to 24.8 in 1949, is partially erased when adjustment is made for changes in the age composition of the policyholder group. The toll of premature death among diabetics in the population as a whole has decreased greatly since the advent of insulin in 1922.

CARDIOVASCULAR-RENAL DISEASES

Deaths from diseases of the heart, arteries, and kidneys are a dominant factor in the total mortality among these insured, and account for nearly one half the deaths from all causes combined. In fact, the diseases of the heart alone outrank by a considerable margin all other causes of death.

The recorded death rate from the group of cardiovascular diseases was 304.0 per 100,000 in 1949, the lowest since 1938.

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EXTERNAL CAUSES OF DEATH

Each of the external causes of death has recorded a marked decline in mortality in the past 40 years. Among the insured, between 1911 and 1949 the rate from suicide dropped 47 per cent, from accidents 51 per cent, and from homicide no less than 60 per cent. For the latter two causes the rate reached an all-time low in 1949; for suicide, only the war years 1943-1945 showed lower rates in the past three decades.

The marked reduction in the death rate from accidents represents in large measure the reduced frequency of fatal mishaps in the home and in industry. But even the death rate from motor vehicle accidents has been declining in the past three years. In fact, the rate in 1949 was the lowest in three decades except for the war year 1943, when travel was restricted. Based on mileage, the death rate from motor vehicle accidents reached a new minimum in 1949.

OUTLOOK FOR THE FUTURE

Remarkable progress has been made in improving the health and longevity of the American people in the past half century, and the outlook is bright for future gains. More effective use of the measures which have already proved so successful will yield a still greater harvest of life. More and better medical and hospital facilities and services will likewise make a contribution toward this end, as will the intensive program of health education. In addition, newer knowledge is rapidly being accumulated and put into practice. Major efforts from now on need to be concentrated on solving the problem of the chronic diseases, which have become the chief cause of premature death in our country.

A NATIONAL CEREBRAL-PALSY PROGRAM*

Samuel M. Wishik, M.D.

Director Bureau of Child Health, New York City Health Department

What are we doing about the combined health and education problem of children with cerebral palsy? How well have we developed in our country the basic services that are concerned with the health and education of all children and that must be called upon if the special needs of the 150,000 cerebral-palsied children under 17 years of age can be adequately met?

Of the nearly 3,200 counties in the United States, one-third do not have an organized full-time local health department, and many of the remainder have inadequate public-health programs. One-half the counties do not have a single school physician and one-third do not have either a physician or a nurse doing health work in the public schools. At the last compilation, the average expenditure by our States for school health was 79 cents per child per year. One State spent as little as 2 cents per child per year.

We must consider what figures like these mean for cerebral palsy. The services needed by cerebral-palsied children have been recounted many times. The list of specialties involved is long—pediatrics, orthopedics, neurology, psychiatry, psychology, social work, nursing, occupational therapy, physical therapy, speech instruction, and others. The list of necessary resources likewise runs the gamut—clinics, diagnostic services, hospitals, convalescent homes, residential schools, day schools, institutional care, and others. In response to such a description a legislator or taxpayer might well ask: How can we afford that much money? And how can we spare the personnel?

To answer the question on money—in terms of cold dollars and cents we cannot afford to go on as we are, with children unnecessarily institutionalized; adults without remunerative employment, dependent on the community for support; tens of thousands of cerebral-palsied citizens, a tremendous potential reservoir of mental and physical resources, not contributing their capacities to society.

The wealth of a nation rests in its people rather than in its land, its forests, its minerals, or its rivers. Man-built Boulder and Grand Coulee Dams and TVA are converting waste areas into productive land. The Palestinian desert will some day turn into fruit orchards.

*Given at the National Conference on Cerebral Palsy at New York City. Reprinted from *The Child*, January, 1950.

Our wealth is the net result of the accumulation of individual contributions—physical, mental, inventive, constructive, social, and other contributions minus the accumulation of drains made on society by some unfortunate individuals through illness, unemployment, or maladjustment, and by destruction, whether the method of destruction be individual or international. Our cerebral-palsied must be taken out of the debit column and placed on the credit side where they belong. They are a sound investment.

There is a way now whereby every taxpayer feels the pinch and realizes very clearly that he pays in the end for not paying in the beginning. Although we, unlike some primitive societies, do not kill off our members at 40 years of age, until recent years the care of old people was anybody's business. We did not think of making systematic allowance for security in old age. With our increasing acceptance of government responsibility for old-age security, we can now measure in dollars how expensive it is to have so many of our total adult population unemployed because of physical handicap, not contributing even payroll deductions toward the care that society will have to give them in their later years. The rest of us pay for this care.

Aside from the cost, the question is often asked: How can society be expected to take vast numbers of especially trained and experienced personnel and such extensive facilities and set them aside exclusively for cerebral palsy? The answer is that we cannot and should not.

That may be a strange thing to say. Isn't cerebral palsy a tremendous problem? Yes! But the cerebral-palsied person does not have to be removed from society and set off by himself in order to get all the specialized care he needs.

Just because a given cerebral-palsied child needs a special clinic for diagnosis does not mean that that particular child necessarily needs specialized schooling or a separate approach to his other needs. And just because a certain cerebral-palsied child at 8 years of age is found to profit from a special class in elementary school does not mean that he will not adjust excellently in a regular class in high school.

DO NOT ISOLATE THE CEREBRAL-PALSIED

The cerebral-palsied person must not be stigmatized as being so different that he cannot belong to a general group, that he cannot attend regular activities, and that he cannot receive service from specialists who are working with other problems as well as with cerebral palsy.

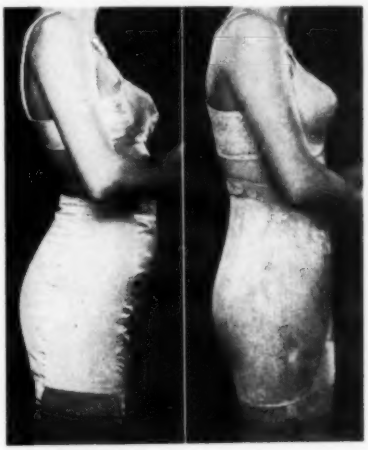
Our community services are organized in two ways, by functions and by population groups. As an illustration of the functions, we have schools for education and hospitals for sickness. As for population groups, we have schools for children and separate schools for adults. Sometimes we go too far in developing separate services for certain groups of people, such as having two hospitals side by side giving the same kinds of service. Too many of our activities are wastefully set up in duplicate fashion for different population groups.

We must try to strike a better balance between the two methods of community organization on the basis of convenience and effectiveness. We must remain flexible in our planning.

If we can first locate the cerebral-palsied children most effectively by having a general clinic for all children who have trouble walking or using their hands or talking—then let us have a general clinic for case finding.

If we can get the best kind of specialized diagnosis for cerebral-palsied persons by means of a special cerebral-palsy clinic, such a clinic should be set up.

And, after specialized diagnosis, if we have in a school five cerebral-palsied children who need speech instruction, and there are half a dozen others who have cleft palate, or who stutter, then we set up, not a cerebral-palsy class, but a speech class. And if in the school there is a small number of cerebral-palsied children who need daily physical therapy, and several other orthopedically handicapped children who could profit from physical therapy, then, under medical supervision, let us offer physical-therapy services in that school to all the children who need it—regardless of diagnosis.



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*Perry, Layne, D.O.: *Faulty Posture As An Important Cause of Some Types of Anorectal Pathology:* Osteopathic Profession: 14: 28-52, (Oct.) 1946.

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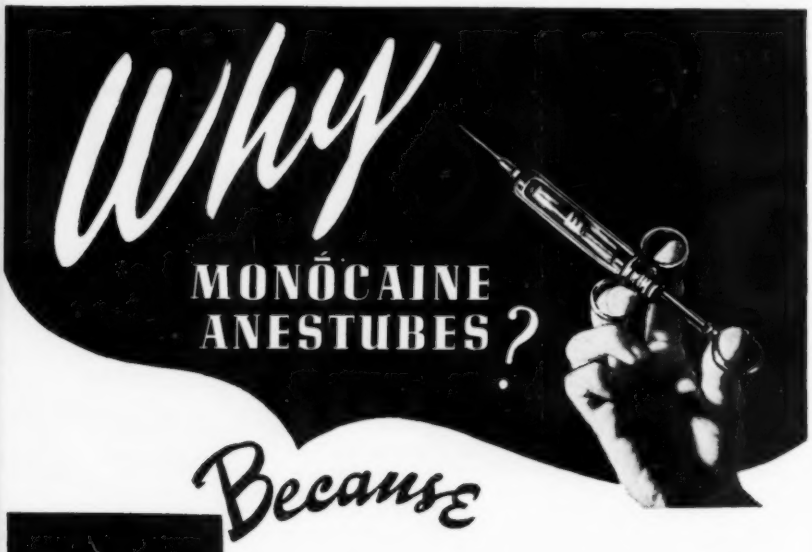

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Obviously, we have a better chance of getting special speech instruction or physical therapy for the larger number of children and for the different kinds of needs. And it is better that way for every reason. For the cerebral-palsied children then have a chance, even in the special periods, to mingle with other children. And it is good for the others to get to know the cerebral-palsied children. For the teachers and other professional workers, it is wise to devote somewhat less than 100 per cent of their time and study exclusively to cerebral palsy. Constant comparison between children with all types of handicap or with no handicap is good practice for the professional worker.

In our community structure special services are built upon the general services and depend upon them. A complete battery of personnel and facilities is not repeated for each diagnostic condition—for rheumatic fever, for poliomyelitis, for cerebral palsy—separate nurses, teachers, doctors, except for that period when the children need them. The rest of the time, the same children need good general services—good general education, health supervision, and so forth. In such a setting, cerebral-palsy services once established are most likely to survive and to flourish.

This does not mean, however, that there is one rigid sequence or priority of development. We must not necessarily wait for the perfect school system and health service before developing a cerebral-palsy service. Good speech instruction even with little else is valuable; good medical care without special education is a contribution, though weighted in one direction. Whichever component is established, however, must itself be on solid ground. To illustrate, physical therapy must have qualified medical supervision; special school placement without medical diagnosis is obviously improper.

HOW SPECIAL SERVICES GROW

Having good basic resources will not automatically produce a cerebral-palsy service. Our experience to date shows us how long the very best of our communities went without attempting to meet cerebral-palsy needs. As a matter of fact much of our growth in this direction does occur in somewhat reverse fashion. Scattered local school systems institute special services such as a crippled children's class, a speech teacher, or a remedial-reading teacher. Soon the State department of education finds it necessary to give a label to the special services, to set aside or earmark funds for them, to establish standards and curriculum information and to give supervision and consultation to them. Now 34 State departments of education have directors for education of exceptional children, many of which resulted from grass-roots development.

It is clear that a simultaneous attack of two kinds is therefore necessary—the general and the specific. While we give every possible support to strengthening our basic community resources for health and education, we must at the same time work for developing special programs, and then we must try to get each component of the special program such as speech teaching or health supervision in the school strengthened, extended, and finally generalized.

A striking example of this dual approach is in professional training. The greatest single obstacle today to adequate care for cerebral-palsied persons is the lack of personnel trained and experienced in cerebral-palsy work. If today we had at our disposal all the funds we wanted, we could not immediately make an appreciable dent in the problem. We would first have to concentrate on training doctors and other workers. Nor would we find professional schools ready, equipped, or financially able to absorb the student load we would want to place upon them. Therefore, those who are interested in development of better cerebral-palsy services must not only give aid to the training of certain individuals to come back to work in their own community service; they must have a special stake in moves to give public support to medical schools and other professional teaching institutions.

There are obvious reasons for stressing the role of government in the problem. First, because government is responsible for the two basic services,

education and public health. In both services, our horizons have widened in recent years.

Educational authorities do not limit themselves to saying, "Here are the schools for your education; come and get it if you can." Educators now accept the responsibility of making education truly available to every child, if necessary by means of special transportation and classroom equipment, by lip reading for the deaf, and so forth.

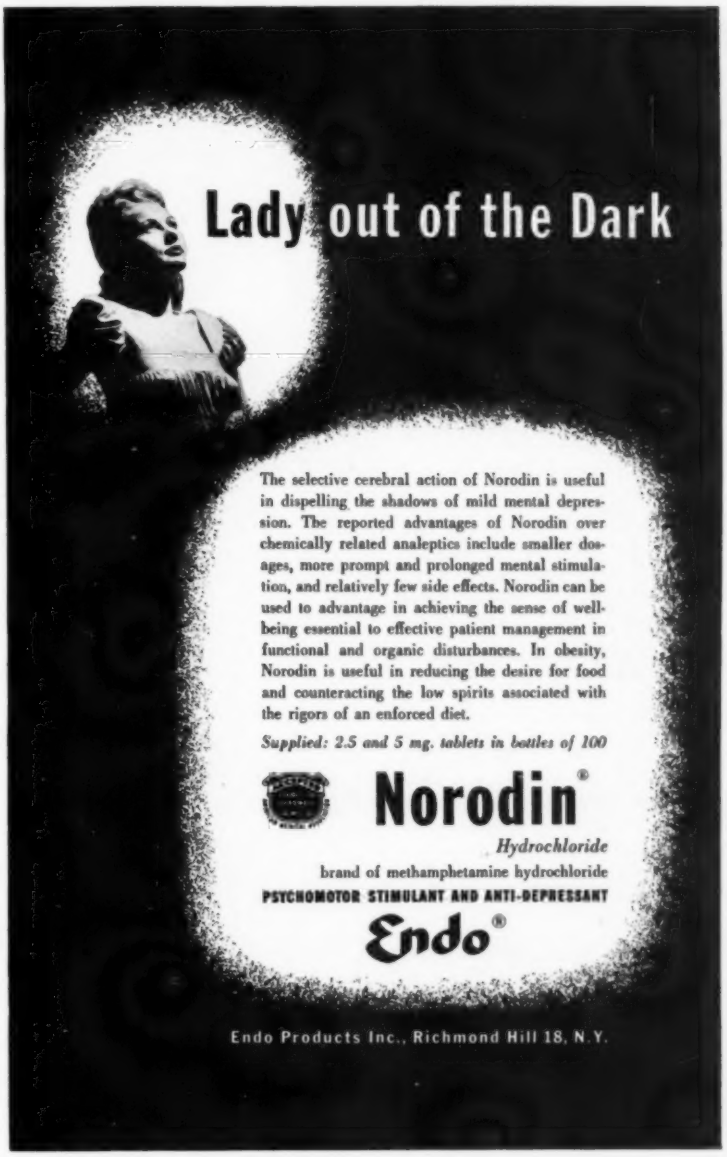
CEREBRAL PALSY NOT AN INDIVIDUAL PROBLEM

Likewise, public health has attained a broader outlook. In earlier days, its interests were impersonal ones, such as epidemics and sanitation of water and milk supply. Today we believe that our public health is the net total of the good health or lack of good health of all our 140,000,000 individual citizens. And cerebral palsy is a public-health problem. It is not an infectious disease, but like such a disease it affects more than the patient himself. It limits the happiness and productivity of the other members of the family as well as of the patient, and it makes demands upon the time and efforts of professional workers.

Nevertheless cerebral palsy has not received adequate public support, probably largely because of the cost. Such a program is expensive, true, but how does a government—Federal, State, or local—arrive at the decision that a problem is unworthy of the expenditure?

A short time ago, our Federal Government spent close to a million dollars to rescue 12 men stranded on a Greenland ice cap. Of course they should have been rescued. Of course, the money should have been spent. Everyone agrees. But how many States have indicated that their cerebral-palsied citizens, numbering many more than 12, are at least as worthy of salvage as the 12 in Greenland? And so when a program is disapproved on the grounds of being too costly, it may be that we just have not convinced ourselves and our representatives that these people are worth while bothering about.

A second reason for emphasizing the government's part in the problem is the diversity of services which must be pulled together for cerebral-palsy work. Few hospitals or nonofficial agencies in the country can afford to carry an extensive cerebral-palsy program without financial assistance. And no voluntary group can be expected to develop its programs on the basis of the total community problem or to accept responsibility for all in need. A voluntary organization is compelled to keep its services within its own limited capacity and resources. Every good cerebral-palsy program, no matter how few persons it serves, is a contribution to total success, but we must aim for an over-all plan to meet the various needs of all the cerebral-palsied persons in a community, in the State, and in the Nation. No matter how comprehensive a private or voluntary cerebral-palsy program may be in a community, the government almost always must share the burden and participate in one way or another.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In speaking of the cost of care we have not yet mentioned the family's financial part. Cerebral palsy is no respecter of station or of wealth. It strikes all sections of the population.

Some wealthy families are able to pay all costs. But how many other families are there, even the comfortably situated, who can carry the costs of years of service from physicians, speech teachers, and physical and occupational therapists, in and out of hospitals? Very few can do this. Therefore, the benefits of cerebral-palsy programs as they are developed should be made available to all, regardless of their economic status, and parents should be given a chance to pay what they can afford, without pauperizing themselves and also, without depriving themselves and their other children of the necessities and reasonable pleasures of life, and in full recognition of the limited vocational opportunity and earning capacity that will face some of the cerebral-palsied children when they reach adulthood.

Another very important contribution to the battle against cerebral palsy is the association of interested citizens. It is largely through the work of citizens' groups that interest in cerebral palsy has increased so much in recent years and

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* *W. J. Reich, M.D., F.A.C.S., and M. J. Nechtow, M.D.: American Journal of Obstetrics and Gynecology, Sept. 1948. (Mod. Med., May 15, 1949.)*

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that new programs have been begun in various parts of our country, in Canada, in England, and in other parts of the world. Part of the strength of these citizens' groups lies in the fact that they are composed largely of relatives of cerebral-palsied persons. Because of their own personal experiences in futile searching for adequate care, they have the kind of zeal and stick-to-it-iveness that gets results.

PLAN NEXT STEPS WITH CARE

From now on, however, that special strength—their immediate personal investments—may become a weakness in citizens' associations. The first obstacles in our path have been overcome. The general public is getting interested in cerebral palsy, legislators are more sympathetic, the professions are becoming increasingly cognizant of it. More programs are waiting to spring up on all sides. The period ahead demands careful planning and sound community organization. Programs should be developed on the basis of over-all need, of effective integration with existing facilities, and of likelihood of good results. A citizens' group should encompass a broad base of the community, including both lay persons and professional workers. Parents of cerebral-palsied children and adult cerebral-palsied persons themselves will and should continue to be among the leaders and to bring to the groups the benefits of their experiences, whether bitter or pleasant, and of their strong conviction of the tremendous importance of the problem.

But there will be times when the best sequence in adding new components to a community cerebral-palsy program will require giving service sooner to one group of cerebral-palsied persons than to another; such as to preschool children before school-age children, or vice versa, or to the work of vocational aid for adults rather than speech instruction for children. The time table of the steps will differ from place to place, but the goal of a full, comprehensive program is the same for all. Parents will at times find themselves in the painful position of supporting their citizens' group in sponsoring a program which helps another's child, not their own. That is not at all easy, but at first it must be done. Broadening the composition of the citizens' groups will temper the decisions of the group with more objectivity.

On occasion, an entire lay association will properly support a community decision to postpone the actual giving of service until personnel can be trained. Here all the cerebral-palsied persons will go without care for a number of months or even years while the association helps to send the future cerebral-palsy workers away for training.

There follows here a seven-point national cerebral-palsy plan. This plan is a practicable one which can be started now—and not a fantasy for a decade or two hence.

1. Stronger school systems in all States, with adequate special educational programs for handicapped children and training programs for special teachers.

2. In every county in the Nation, full-time organized local public-health services.

3. Expansion of school health activities and crippled children's services. Establishment of cerebral-palsy programs as rapidly as is feasible and of training centers for cerebral-palsy workers.

4. Establishment of a national research center on child life.

5. Expansion and coordination of research on the causes and management of cerebral palsy.

6. Aid to medical and other professional schools so that larger numbers of better-qualified professional workers can be trained.

7. Enlarging the membership of citizens' associations working for improved cerebral-palsy care; and support by the associations for community education, professional training, scientific research, and services for cerebral palsy. Participation of the citizens' associations on joint councils and on advisory committees of official agencies at the Federal, State, and local levels.

Attainment of this program would establish both a solid community framework and sound special services for the well-being of our cerebral-palsied citizens.

THE CONCEPT OF MULTIPHASIC SCREENING

*By A. L. Chapman, M.D.**

As tests for specific diseases have been perfected, methods have been developed for applying these tests on a mass basis. The chest X-ray for tuberculosis and the serological test for syphilis are typical examples of tests suitable for mass application. Recently a quick and economical method of testing small samples of blood for sugar has been worked out thus making it possible to screen out people in whom the index of suspicion for diabetes is high. In nutrition surveys it has been common practice to determine hemoglobin levels which give some indication of the presence or absence of anemia. Vision and hearing testing is routinely done in school examinations, and in some pre-employment examinations. The taking of blood pressures, a relatively simple procedure, is a common practice in hospitals, physicians' offices, and during physical examinations.

Until recently, mass testing of the population, using the tests and procedures mentioned above, has been limited in many areas to one test or to one procedure. There have been separate mass surveys for tuberculosis, for syphilis, and for nutritional deficiencies. It is perfectly logical now for public health administrators to ask the question, "Why not combine as many of these tests as practical into a battery of tests, reduce the over-all cost of administering them, and thereby encourage universal usage?"

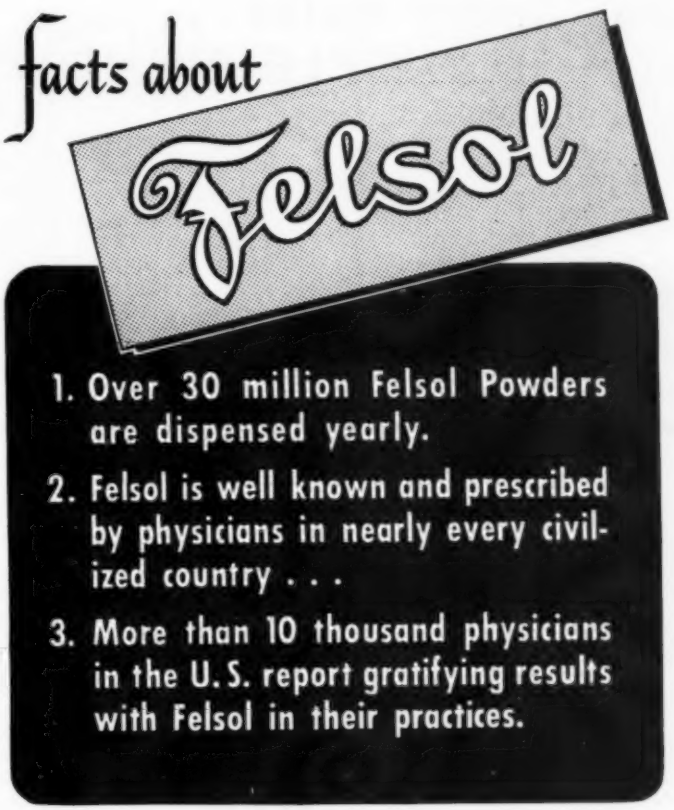
The cost of organizing a community and educating the public to the point where individuals will report for a screening examination should be proportionately less than separately organizing the community for each individual test. A single person may be examined for two, or three, or a half dozen diseases, at one time, thus making it unnecessary to have him report to several different centers at various times for single examinations. This consolidation of testing procedures results in a considerable saving in administrative expense.

Another source of economy in a multiphasic screening program is in the cost of personnel. By multiplying the number of examinations on a single specimen of blood, more examinations may be made in a given unit of time by one person than when the number of examinations is limited. If one specimen of blood is examined for evidence of syphilis, diabetes, and anemia, blood has to be drawn only once and only a single specimen has to be examined. The same thing is true of the chest X-ray. It takes only a little more time for the radiologist trained in cardiology and tuberculosis to examine the chest film for evidence of heart disease and lung pathology other than tuberculosis than it does to examine the film for evidence of tuberculosis alone.

By setting up a battery of tests certain personnel may serve double duty. Height and weight may be taken by personnel assisting in the other procedures. One technician may test both for vision and hearing defects. In other words, the duties of a large staff may be arranged in such a way that neither time nor effort is lost.

A contemplated advantage of the multiphasic screening program is that it may be adapted to the resources, in terms of personnel and facilities, that are locally available. When resources are extremely limited, the program may have to be an exceedingly simple one. For example, the multiple testing may be limited to blood examination. These blood screening tests will indicate those in the examining line who should be examined by physicians for syphilis, diabetes, and anemia. If X-ray equipment and technicians are available, a chest X-ray for tuberculosis, heart disease and lung pathology may be added. Or a more elaborate series of tests may be set up with little added expense—a series that would include, in addition to the chest X-ray and blood examination, the taking of height, weight, and blood pressure; vision and hearing testing; and even the determination of intraocular pressure in adults to detect the presence of glaucoma. When local health personnel and facilities are meager or lacking, the detection of early cases of chronic illness

*Chief, Division of Chronic Disease, Bureau of State Services, Public Health Service.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is nevertheless valuable in order to delineate the problem.

Multiphasic screening examinations are not intended to screen out of the population every case of diabetes, syphilis, tuberculosis, and the other diseases for which tests are made. It is intended, rather, to screen out in the most economical fashion many thousands of cases that would not otherwise be found. Although for practical purposes a screening test may be a diagnostic test, the whole screening procedure is not intended to result in the actual and immediate diagnosis of disease. It is intended to raise the index of suspicion for a disease so that additional tests will be done. The diagnosis is made or rejected by the private physician or by the diagnostic clinic.

The multiphasic screening program can become very useful in the control of the chronic diseases which, at the moment, are receiving emphasis because of the rapid increase in the size of our older population. Lacking adequate means of preventing many of the chronic diseases, early diagnosis and early treatment constitute a very effective operation which health departments can undertake in this field. Hypertensives, diagnosed early, can frequently be kept under control by diet therapy. Diabetics can certainly lead a reasonably normal life if found early and placed under adequate medical supervision. The availability of antibiotics for the treatment of syphilis makes the development of the late manifestations of syphilis almost inexcusable. Even cardiacs may be benefited if their cardiac pathology is known and evaluated in time.

The productiveness of a multiphasic screening program can be estimated by a study of prevalence statistics. Based on national estimates, a screening examination of 1,000 apparently well people over the age of 15 for syphilis, diabetes, glaucoma, anemia, tuberculosis, obesity, vision defects, hearing loss, hypertension, and heart disease would result in finding 976 cases of these diseases or pathological physical conditions. Some of the 1,000 people screened probably would have two or more of these diseases or conditions, whereas others would have none. For example, one person might have syphilis and diabetes; another might have a significant refractive error and glaucoma; and still another might be obese and hypertensive.

The distribution of the cases would be as follows: there would be 48 cases of syphilis; 22 cases of diabetes; at least 20 people would have glaucoma (more than 3 per cent of the population over 40); 75 would be anemic; 18 or more would have tuberculosis; 200 would be obese; in 266, vision defects would be found; 250 would have a partial hearing loss; hypertension would be present in 38; and at least 39 would have heart disease.

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Many of these cases ordinarily may not come to the attention of physicians until definite signs or symptoms have developed. In every community today many people with a chronic disease or a remediable disability, such as faulty vision or a progressive aural disease, are going about their work unaware of the fact that there is anything seriously wrong with them or that they will eventually become hopelessly ill, or permanently disabled. By the time signs and symptoms, which send them to their physician, do develop, much valuable time has been lost and irreversible pathology has been established.

A multiphasic screening program is designed to refer many more persons to physicians for diagnosis and treatment at an earlier stage of their disease than now go of their own volition. These persons will go to physicians not after a chronic illness has rendered them permanently disabled, both economically and physically, but at a time when prompt treatment can assist them to maintain their physical and economic integrity. This is as important to the physician as it is to the patient.

From the point of view of the taxpayer a multiphasic screening program would be highly desirable. The early detection of persons with a chronic illness makes early treatment possible. This in turn decreases the number of days of hospitalization, and the total amount of medical care required. It therefore lessens the financial burden placed on public agencies that have to provide medical and hospital care for the indigent sick. Another factor of importance is that the prevention of the late complications of chronic illness makes it unnecessary to provide the services of as many able-bodied attendants to care for immobilized patients in hospitals and in the home. The service of these attendants places a heavy financial burden on taxpayers and at the same time makes these attendants unavailable for productive employment.

From the point of view of the health officer, the multiphasic screening program provides an opportunity to increase the quantity of tangible services such as those provided so creditably by the tuberculosis control, venereal disease control, maternal and child health, and other similar programs. Too much that the health department does is hidden from public view. It is not hard for the taxpayer to appreciate the value of a fire department as he watches a fire being extinguished nor the alertness of the police department when a criminal is apprehended. It is far more difficult for the taxpayer to realize that his water supply is protected by the application of complex purification methods; that his milk supply is made safe by pasteurization and by periodic examinations; and that many of the acute infectious diseases have been controlled by the efforts of public health workers and the medical and allied professions.

The multiphasic screening program makes an undeniable appeal to the individual who may be ill, to the physician, to the public health worker, and to the taxpayer. It will foster better teamwork among them all. It will reduce the cost of chronic illness in terms of money and in terms of human misery. There are few communities so devoid of public health, medical and hospital resources, that they cannot support some type of multiphasic screening program. All that is needed is a clear concept of what constitutes a multiphasic screening program and the will to adapt it to local needs.—Reprinted from *Public Health Reports*, October 21, 1949.

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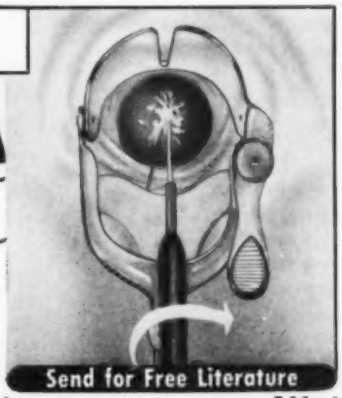

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PHYSIOLOGICAL ASPECTS OF BETTER HOUSING

By Heinz Specht, Ph.D., and Paul A. Neal, M.D.*

The constitution of the World Health Organization states: "Health is a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity."

It is generally accepted that there is a relationship between housing and disease. A causal relationship can be shown to exist between specific diseases and poor housing with unsafe water supplies and sewage-disposal facilities. Both public and private housing are involved, although the most impressive findings have naturally been made in multiple housing of the "tenement" type. However, the coexistence of a low level of public health and bad housing conditions does not necessarily prove that the former is caused by the latter. It may be said without serious reservation that factual data do not exist that demonstrate the exact effects of good or bad housing per se on the incidence and course of illnesses of the occupants, since poor housing has not been separated from other attributes of poverty, such as malnutrition and lack of medical care.

Therefore, since no precise quantitative measurements have been made on the relationship of a disease to housing, the question is, "Can studies of the physiological aspects of the hygiene of housing be expected to give precise information on the physical well-being of the occupants?" A general analysis of the problems may clarify the present position which this field of research occupies.

Physiology is the science which deals with the functions of the living organism and its parts. Hygiene is the science of health and its preservation. Thus, the physiological approach to these problems involves the study of the range of human functions which are affected by housing as contrasted to the usual approach which involves the study of the relationship of a disease entity to housing. The integrated details of such physiological approaches include consideration of comfort and morale.

The adaptability of the several functions of the body to the environment, as housing limits such an environment, varies from one individual to another. The range of such adaptability is greatest in health and proportionately limited by various illnesses. For example, the lower limit of temperature to which the clothed body can adapt itself by increasing its metabolism without shivering is lower in health than in illness. Consequently, the imposition of a temperature lower than such a limit presents a tax on the resources of the body which is especially heavy in illness. The attention of medical science has long been directed to the necessity for observing a rather narrow temperature range in the treatment of disease, but the desirability of considering the effect of temperature on well-being has only recently been advanced. We have intentionally separated illness from well-being and comfort, but there is no proof that violation of the latter does not constitute an introduction to the former. Thus, well-being and comfort cannot be considered wholly as luxuries.

If housing were to be considered in connection with production, the problem could be quantitatively attacked by measurements of efficiency. There has been developed recently an appreciation of the necessity of more accurately designing all types of machinery and equipment for use by human beings around the skills, abilities, and physiological requirements of the human being. In an attempt to utilize this contribution to engineering development and design, it immediately becomes evident that even the more simple and common physiological aspects of the human being are not well enough known statistically to serve as a design basis. Consequently, the new field of human engineering undertakes to provide the essential elements on which to base intelligent design. In the problem of housing, the need for human engineering extends over a wide range of physiological characteristics.

The definitive limits of the various environmental factors affected by housing should determine the steps to be taken in designing and constructing houses from the human point of view. There would be no difficulty in convincing anyone of the necessity for full consideration of physiology in housing, if the situation were as acute and fraught with danger as, for instance, the biodynamic design of the cockpits in airplanes is on the successful operation of our newer aircraft. However, a 6-foot woman working over a 2½-foot kitchen sink is acutely aware of discomfort. The continuing character of these seemingly minor aspects of housing lends considerable weight to their effectiveness in causing poor physiological conditions as well as home accidents.

The physiological approach to criteria of adequate housing must be based on the study of various human functions as they are affected by the environment which houses may provide.

We may begin by investigating such a fundamental function as body temperature maintenance in the face of various air temperatures, radiant heat levels, air humidity levels, and ventilation velocities. This is an active field of investigation in which good methods were evolved during World War II for judgment of extreme conditions, as in arctic and tropical environments. Judgments

*Laboratory of Physical Biology, Experimental Biology and Medicine Institute, National Institutes of Health, Bethesda 14, Md. Presented at the orientation course in the hygiene of housing, Training Division of the Communicable Disease Center, Atlanta, Ga., May 3, 1949.

are based on tolerance for various periods of time, and also, within the limits of tolerance, on comfort and perception of change. In the maintenance of body temperature the tax on the metabolism in cool environments is assessable through measurement of oxygen consumption. The criterion for what limits may be allowable, where they do not entail appreciable discomfort, may be set by economic considerations of caloric diet versus central heating.

Of public interest are studies on the effects of sudden change in environmental temperatures such as result from leaving and entering air conditioned buildings and the associated problem of the effects of spending part of one's time at one temperature level and part at another. Such conditions exist now for a great many people employed in large office buildings and manufacturing plants as well as theaters and stores. Basic physiological information will have to be obtained under controlled conditions in order to analyze these problems.

On the other hand, the maintenance of body temperature in warm environment taxes the heart and circulation. The circulatory regulation is the principal physiological factor in ridding the body of its metabolic heat via radiation, convection, and evaporation. What limit to set on cardiac work short of an acute sense of discomfort requires inquiry into the chronic effects of increased cardiac work on general fatigue. In cardiac conditions added stress certainly produces abnormally adverse effects. The importance of proper home environment for adequate sleep cannot be overemphasized in the management of persons with physiological impairment. Diverse small stresses are additive and may thus constitute the deciding factor between physiological adaptation and dysfunctions ranging to death. Current interest in heart function is setting the pace for thoroughgoing methods of research in this field.

The matter of ventilation is difficult to assess, but one may use functional attributes of the body as critical factors which demand certain levels of ventilation beyond those involved in temperature regulation. Take, for example, the basic matter of odors. To insist on ventilation in a house which eliminate warming odors and smokes is at cross purposes to safety, as well as undesirable from the point of view of air motion and heat economy. It is of prime importance that proper local ventilation in cooking be provided, and it is also desirable to make provision for adequate general ventilation to reduce other odors to undetectable levels. What these adequate levels are can only be determined by studies in the detection of, and adaptation to, odors by the human olfactory organs. The study of odor perception and the quantitative chemical or physical estimation of odorous substances in the air is still in a rudimentary state, mainly through the lack of suitably sensitive and discriminatory devices. It is probable that such studies will progress more successfully now that radioactive labeling of odorous substances is feasible.

The criteria for optimum humidity levels have been upset by considerations other than their effect on the efficiency of the respiratory system in protecting against bacterial invasion. Such functions are currently recognized to be markedly susceptible to changes in humidity. In addition, studies in bacterial survival show that rapid decline in viability may be effected in environments of optimal humidity. Thus, both the incidence of infectious agents and susceptibility to infection may be reduced by proper humidity maintenance.

A great deal has been published, both in the popular press and in the scientific literature, regarding air-borne diseases and their control through specific physical or chemical devices. Most of the studies were made to test such particular devices. These can only be applied to disease organisms which are suspended in the atmosphere in finely dispersed form, either directly or by resuspension. The part played by this type of infection in the transmission of disease has yet to be quantitatively established under laboratory conditions. The epidemiological approaches to this question made in the past are indeterminate, because they necessarily involve other modes of disease transmission than by air.

The high incidence of attacks of hay fever and asthma in the general population is principally caused by dusts and pollens. The elimination of dusts and pollens from the house environment will reduce materially the debilities and discomfort produced by such substances. It seems possible that with recent advances, filtration and precipitation of air-borne dusts and pollens is economically feasible at the housing level.

Numerous studies indicate that poor illumination has deleterious effects on efficiency and comfort, and is the cause of a great number of home accidents. Conclusive information on the causal relationship between poor illumination and organic injury of the eye is not available. Current information on the relation between illumination and healthy vision indicates that present lighting standards are based largely on practical experience as to comfort and to some extent on efficiency. Until adequate physiological principles can be applied to this field there will always be a great diversity in home lighting, which is often not suited to particular home tasks. The problem of what constitutes the proper intensity of illumination should be dictated by the nature of the task, and to some extent by the characteristics of the individual, such as age and correction of visual defects. Many properties of illumination, other than intensity on the work, are of prime

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importance. These include direction, distribution over the surrounding areas, reflectance of surfaces in the range of vision, and color of light and objects. Both artificial and natural light must be built into houses since illumination affects all our conscious functions. The absence of natural light, while it may be advantageous from an engineering point of view, both thermally and otherwise, is not compatible with either aesthetic or sensible comfort in the opinion of many people. This is evident to real estate dealers who know that natural light in its various aspects such as "sunshine" and "views" is a potent criterion in the free choice of houses and apartments.

A host of practical problems involve the performance of muscular work. Usually these are well within the physiological range and thus not readily assessed by the usual techniques of oxygen consumption and ergometer measurements. The definitive factors in muscular effort in home activities will lie in the relative convenience or ease of carrying out repetitive acts. The criteria are then not muscular potential but psychomotor relationships which may be critically affected by certain mechanical principles. Thus the cleaning of floors, walls, and furniture, as well as the preparation of meals, can be drudgery of the most appalling sort and evoke vociferous complaint. Not all of this is attributable to disinclination for the job, but is in reality due to improper functional arrangement for human performance.

Industrially, noise is recognized as deleterious to efficient operation. Good engineering practice indicates that noise elimination at the source, isolation by soundproofing, and other methods of noise reduction are demanded from the economic standpoint. The harmful effects of noise are particularly obvious in multiple dwellings where interference with proper rest is probably the primary consideration. Thus methods of sound control and the establishment of suitable levels of sound intensity are problems which must be dealt with on an experimental basis.

The various approaches discussed above have been made in an uncoordinated fashion as regards their application to housing. The special requirements of houses in providing a physiologically suitable environment for work and rest, and the tremendous numerical need for improved housing require a concerted program of research in which those particular phases which apply to houses can be intensively prosecuted. The great advances in construction of houses and also recent developments in the field of human engineering require that the physiological aspects of better housing be vigorously investigated. The long-range nature of certain aspects of this problem, and the fundamental character of many of the variables which have been discussed call for a continuing program of research. The integration of the necessary disciplines can best be carried out in a laboratory devoted to the study of the physiological aspects of housing.—Reprinted from *Public Health Reports*, October 28, 1949.

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Books Received

THE PHYSIOLOGICAL BASIS OF MEDICAL PRACTICE. A Text in Applied Physiology. By Charles Herbert Best, C.B.E., M.A., M.D., D.Sc. (Lond.), F.R.S., F.R.C.P. (Canada), Professor and Head of Department of Physiology, Director of the Banting-Best Department of Medical Research, University of Toronto, and Norman Burke Taylor, V.D., M.D., F.R.S. (Canada), F.R.C.S. (Edin.), F.R.C.P. (Canada), M.R.C.S. (Eng.), L.R.C.P. (Lon.), Professor of the History of Medicine and Medical Literature, University of Western Ontario, London, Canada; formerly Professor of Physiology, University of Toronto. Ed. 5. Cloth. Pp. 1330, with illustrations. Price $11.00. The Williams & Wilkins Company. Mt. Royal & Guilford Aves., Baltimore, 1950.

A TEXT-BOOK OF NEURO-ANATOMY. By Albert Kuntz, Ph.D., Professor of Anatomy in St. Louis University School of Medicine. Ed. 5, thoroughly revised. Cloth. Pp. 524, with illustrations. Price $8.00. Lea & Febiger, Washington Square, Philadelphia 6, 1950.

DISEASES OF THE FOOT. By Emil D. W. Hauser, M.S., M.D., Associate Professor of Bone and Joint Surgery, Northwestern University Medical School; Attending Orthopedic Surgeon, Passavant Memorial Hospital, Chicago. Ed. 2. Cloth. Pp. 416, with illustrations. Price $7.00. W. B. Saunders Company, West Washington Square, Philadelphia, 1950.

PRACTICAL NEUROLOGICAL DIAGNOSIS. With Special Reference to the Problems of Neurosurgery. By R. Glen Spurling, M.D., Clinical Professor of Surgery (Neurosurgery), University of Louisville School of Medicine, Louisville, Kentucky. Ed. 4. Cloth. Pp. 268, with illustrations. Price $5.00. Charles C Thomas, Publisher, 301-327 E. Lawrence Avenue, Springfield, Ill., 1950.

THE PRINCIPLES AND PRACTICES OF REHABILITATION. By Henry H. Kessler, M.D., Ph.D., Director, Kessler Institute for Rehabilitation; Attending Orthopedic Surgeon, Hospital and Home for Crippled Children, Newark City Hospital, Newark Beth Israel Hospital and Hasbrouck Heights Hospital; President, National Council on Rehabilitation, in collaboration with 20 other authors. Cloth. Pp. 448, with illustrations. Price $9.00. Lea & Febiger, Washington Square, Philadelphia 6, 1950.

ADVANCES IN SURGERY. Editorial Board—William DeWitt Andrus, New York, Chairman; Hugh Cairns, Oxford; Edward D. Churchill, Boston; Clarence Crafoord, Stockholm; Lester R. Dragstedt, Chicago; Emile Holman, San Francisco; John S. Lockwood, New York; D. W. Gordon Murray, Toronto; Alton Ochsner, New Orleans; Isidor S. Ravdin, Philadelphia. Volume II. Cloth. Pp. 462, with illustrations. Price $11.00. Interscience Publishers, Inc., 215 Fourth Ave., New York 3, 1949.

BRAIN AND BEHAVIOUR. Induction as a Fundamental Mechanism of Neuro-Psychic Activity. By N. E. Ischlondsky, M.D., New York. Cloth. Pp. 182, with illustrations. Price $7.00. C. V. Mosby Company, 3207 Washington Blvd., St. Louis 3, 1949.

QUINIDINE IN DISORDERS OF THE HEART. By Harry Gold, M.D., Professor of Clinical Pharmacology at Cornell University Medical College, Attending-in-Charge of the Cardiovascular Research Unit at the Beth Israel Hospital, Attending Cardiologist at the Hospital for Joint Diseases, Managing Editor of the Cornell Conferences on Therapy. Cloth. Pp. 116. Price $2.00. Paul B. Hoeber, Inc., 49 E. 33rd St., New York 16, 1950.

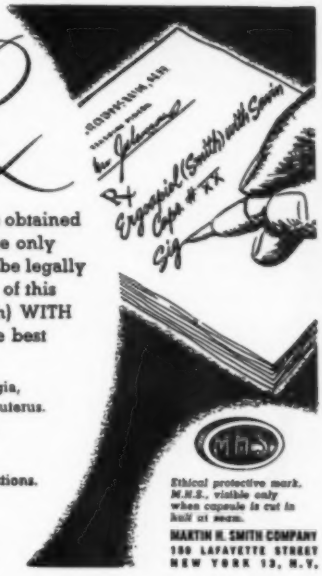
OFFICE ORTHOPEDICS. By Lewis Cozen, M.D., F.A.C.S., Attending Orthopedic Staff: The Orthopedic Hospital, Veteran's Hospital, Los Angeles County Hospital, Cedars of Lebanon Hospital, Los Angeles, and Los Angeles Tuberculosis Sanitarium, Monrovia, California; Assistant Professor of Orthopedic Surgery, College of Medical Evangelists, Los Angeles. Cloth. Pp. 232, with illustrations. Price $5.00. Lea & Febiger, Washington Square, Philadelphia 6, 1950.

THE DRUG STORY. By Morris A. Bealle. Cloth. Pp. 240. Price $4.00. Columbia Publishing Company, P.O. Box 1623, Washington, 1949.

THE SEXUAL PERVERSIONS AND ABNORMALITIES. A Study in the Psychology of Paraphilia. By Clifford Allen, M.D., M.R.C.P., D.P.M., Physician in Charge of the Psychiatric Department of the Seamen's Hospital, Greenwich; Psychiatrist to the Ministry of Pensions, London. Ed. 2. Cloth. Pp. 346. Price $5.00. Oxford University Press, 114 Fifth Avenue, New York 11, 1949.

MEDICAL DISEASES OF THE KIDNEY. By J. F. A. McManus, M.D., Associate Professor of Pathology, The Medical College of Alabama, Birmingham, Alabama; late Beit Memorial Fellow in Medical Research, the University Museum, Oxford, England. Cloth. Pp. 176, with illustrations. Price $6.00. Lea & Febiger, Washington Square, Philadelphia 6, 1950.

PRIMER OF ALLERGY. A Guidebook for Those Who Must Find Their Way Through the Mazes of This Strange and Tantalizing State. By Warren T. Vaughan, M.S., M.D., Richmond, Virginia. Ed. 3, revised by J. Harvey Black, M.D., Dallas, Texas. Cloth. Pp. 176, with illustrations. Price $3.50. The C. V. Mosby Company, 3207 Washington Blvd., St. Louis 3, 1950.



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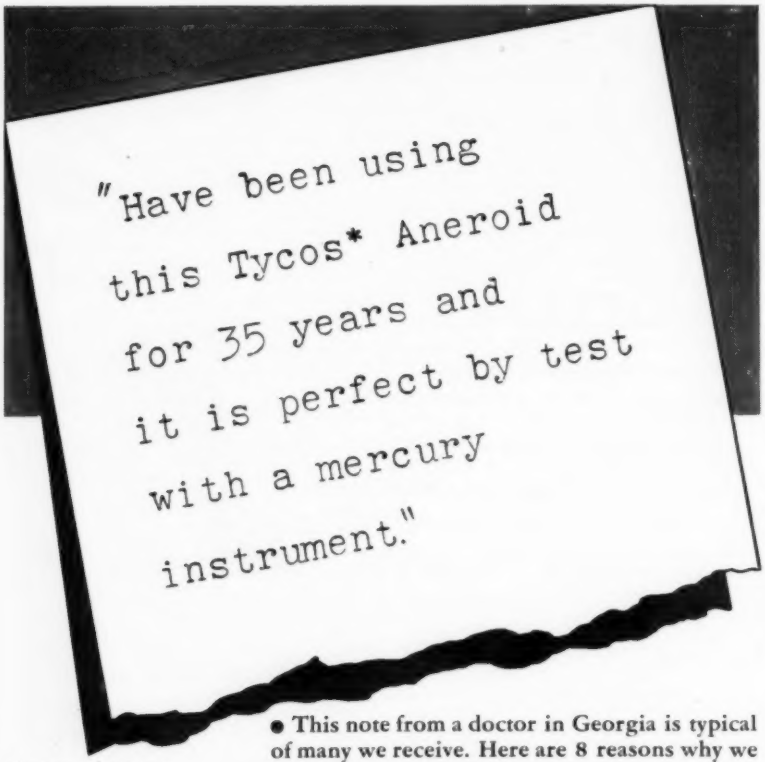

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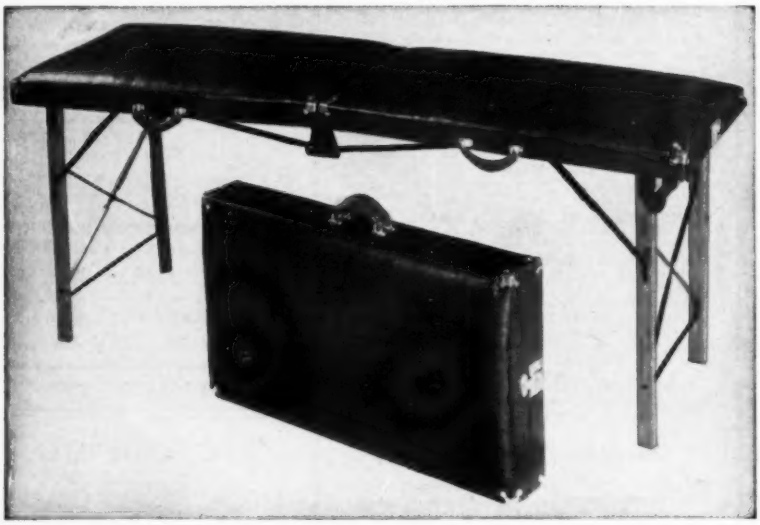

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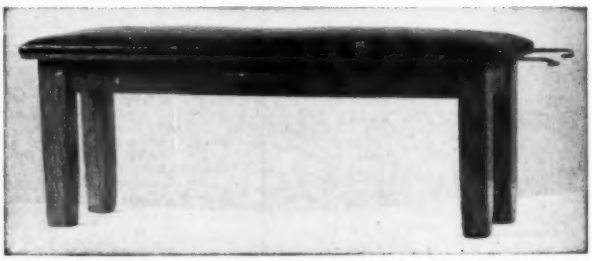

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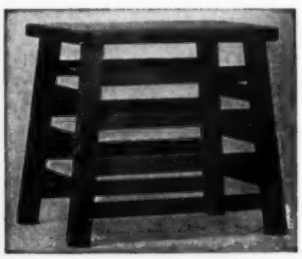

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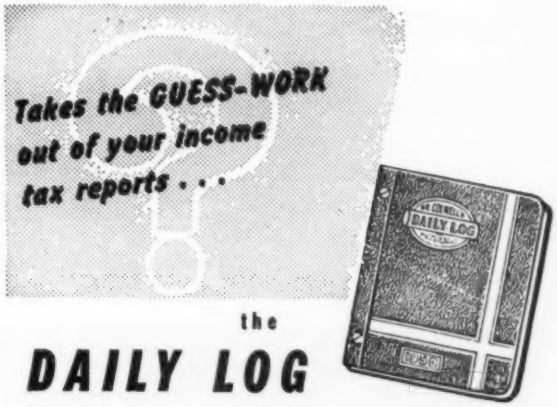

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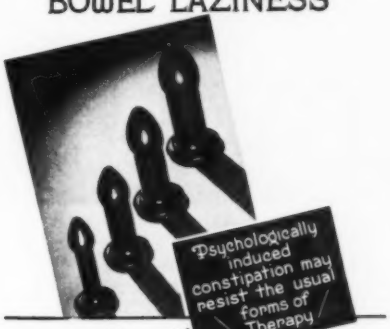

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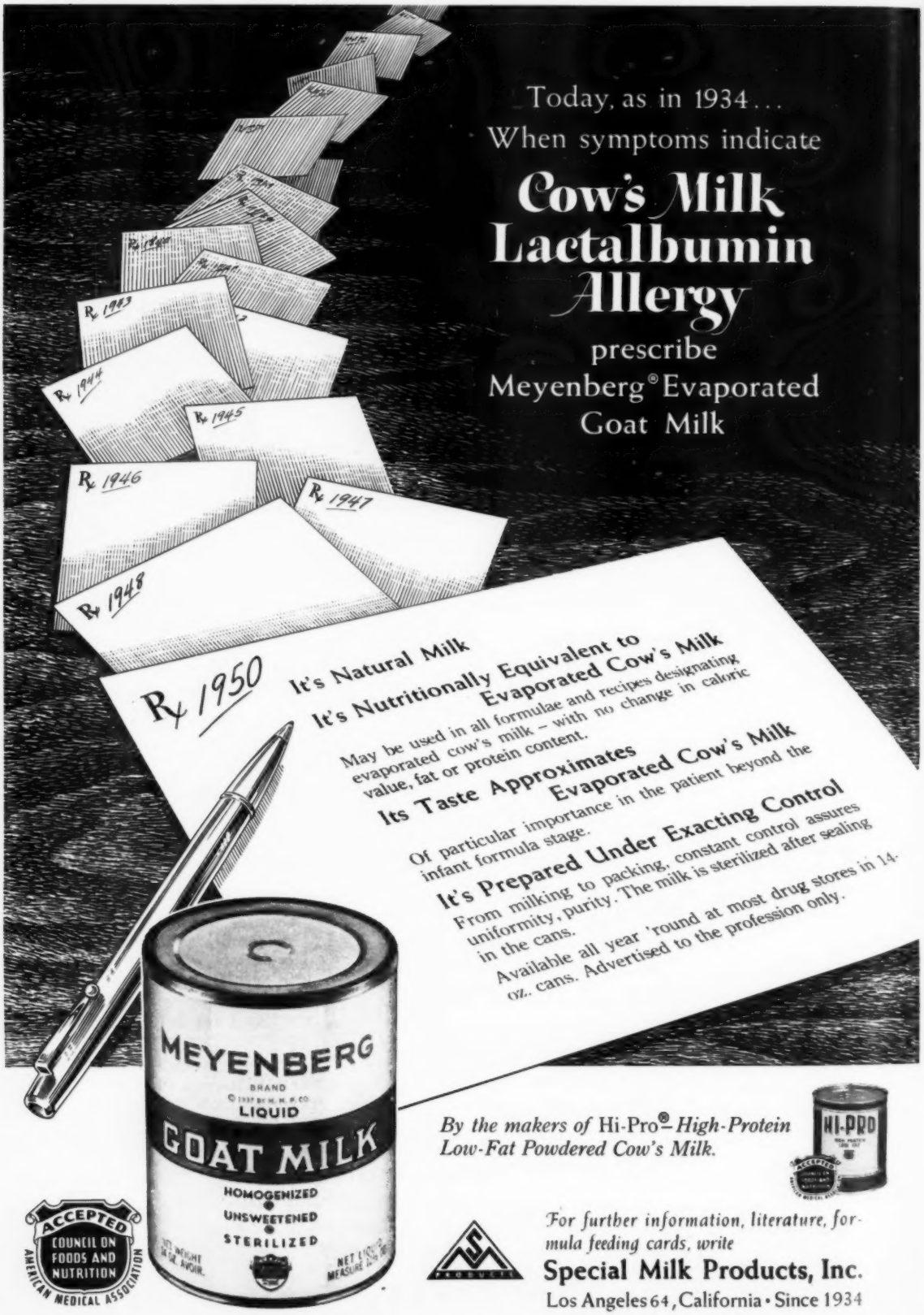
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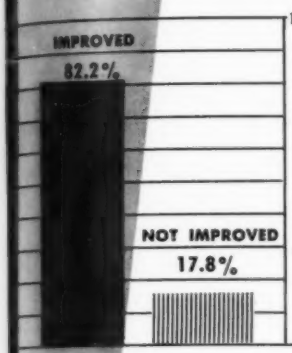

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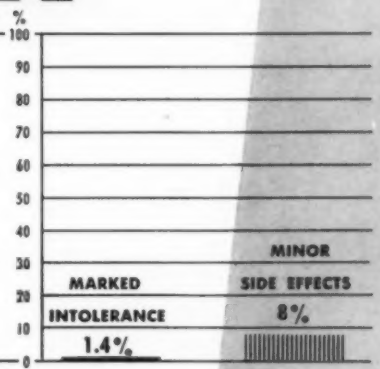

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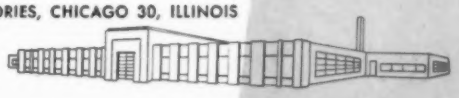

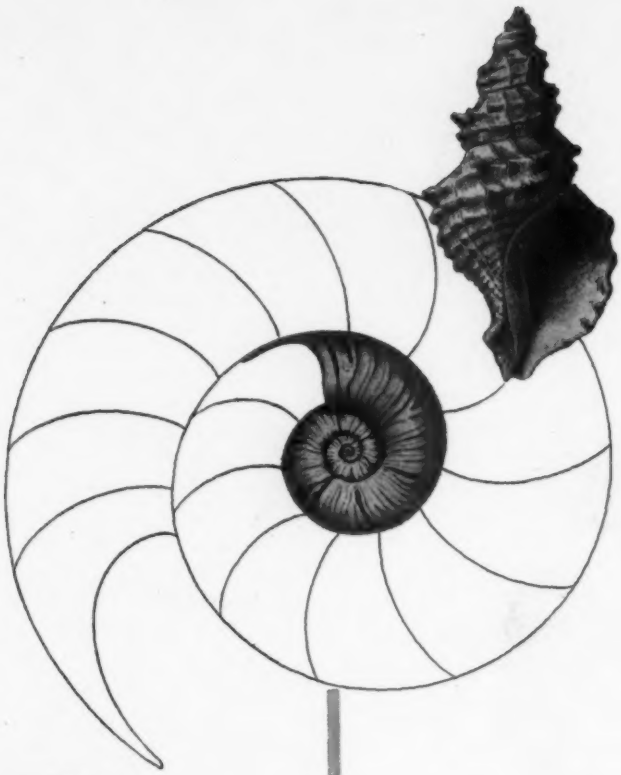

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